Columbia University Lectures

DYNAMIC PSYCHOLOGY

THE JESUP LECTURES
1916-1917

COLUMBIA UNIVERSITY PRESS
COLUMBIA UNIVERSITY
NEW YORK CITY

SALES AGENTS

LONDON
HUMPHREY MILFORD
AMEN CORNER, E. C.

SHANGHAI
EDWARD EVANS AND SONS, LTD.
30 North Szechuen Road

COLUMBIA UNIVERSITY LECTURES

DYNAMIC PSYCHOLOGY

BY

ROBERT SESSIONS WOODWORTH, PH. D.

PROFESSOR OF PSYCHOLOGY, COLUMBIA UNIVERSITY

New York

COLUMBIA UNIVERSITY PRESS

1922

Set up and electrotyped. Published January, 1918
Reprinted June, 1920; December, 1922

To

G. M. W.

PREFACE

The Jesup Lectures for 1916-1917, given at the American Museum of Natural History with the cooperation of Columbia University, are here reproduced with some enlargements and modifications.

CONTENTS

DYNAMIC PSYCHOLOGY

I

THE MODERN MOVEMENT IN PSYCHOLOGY

Like other ancient branches of learning, psychology has undergone in the last hundred years a change and development amounting to a revolution. Not only has there been rapid growth in knowledge and in the number of persons devoting their time and ingenuity to the increase of knowledge in this field, but there has occurred a remarkable change in attitude, method, and standards. The change can be characterized, in a word, by saying that psychology has become an empirical science. It has ceased to be a chapter in general philosophy, and become one of the 'special sciences'. Leaving the parental roof, it has followed its older brothers, physics, chemistry, and biology, out into the world, and set up business for itself. The transformation of psychology is a phase of the general scientific movement properly to be called the great outstanding fact in the history of the nineteenth century. As the social movement of the past century was a result of the industrial development, and this in turn dependent on the progress of science, the latter may rightly be named the real fundamental movement of the century. It was the extension of scientific interest and method from the inorganic world to the realm of living creatures, and from life in general to the special forms of living activity which we call mental, that fructified the mental philos-

ophy of the older day, and gave us the psychology of the present.

At the opening of the nineteenth century, psychology, as we call it today, though the name was then little used, could already boast of a long history. It could scarcely have been true that the philosophic minds of early days should have omitted from their view the mental performances of mankind. Socrates, in fact, taught that to 'know thyself' was the prime factor in wisdom; and Aristotle, among the numerous writings in which he reduced to order the thought of the ancient Greeks, composed a treatise on psychology, the 'science of the soul', destined to remain for many centuries without a serious rival. In the early modern period, while 'natural philosophy', developing a technique of its own, split off from the parent stem and became the science of physics, 'mental philosophy' remained bound up with general philosophy to such a degree that now it is almost impossible, in reading the philosophers, to disentangle their psychology from their teachings on logic, ethics, and the criticism of knowledge.

Locke, the founder of the British empirical school in philosophy, wrote an *Essay Concerning Human Understanding*, a title appropriate, one would suppose, for a chapter in psychology. But Locke's dominant interest was not precisely psychological; he was less concerned with the actual process of knowing than with the validity of knowledge, and was therefore contented with a rather sketchy treatment of the processes themselves. Rejecting the view, strongly held in his day, that certain fundamental ideas were innate, he taught that all ideas are ultimately derived from the indi-

vidual's experience, and have accordingly no more validity than the experiences on which they are based. Simple ideas of color, form, solidity, number, etc., come to us through the senses from external objects, while simple ideas of remembering, thinking, and other mental operations come to us from the occurrence of these operations within us. These simple ideas we compound, compare, and abstract, and thus acquire the great variety of our complex ideas. Knowledge is the perception of the agreement or disagreement between two ideas; it is therefore limited to our ideas, as these are limited to our experience; and it is further limited by our inability to discover agreement or disagreement between many of the ideas which we possess. Further, accidental coupling of ideas in our experience may make it impossible for us to see disagreement and incoherence where such exists; and 'enthusiasm' may lead us to make assertions where we have no real perception. These excerpts from Locke illustrate the trend of his interest; his attention passes lightly over the actual processes of thought in its eagerness to evaluate their results; yet Locke is undoubtedly an important landmark in the progress towards psychology.

This absorption in the problem of the validity of knowledge dominated Hume, also, and the rest of Locke's successors, both British and continental, down to and into the nineteenth century. They had also an interest in human conduct, but it was rather an ethical interest, concerned with what man ought to do, than a psychological, concerned with what he does; or the latter, only as a basis for the former. True psychological knowledge was, however, slowly accumulating, and

the time seemed ripe for the splitting off from philosophy of a branch of study which, leaving aside the philosophical implications of the information gained, should set itself whole-heartedly to the task of examining the mental activities of men. One thing was necessary before such a splitting-off could occur—a recognition of the urgent need for more facts, and for fruitful and trustworthy methods of obtaining the facts. Many of these psychologists, or philosophers, of the pre-scientific age were distinctly empirical in tendency, and cannot fairly be accused of 'spinning their theories out of their own heads'. They endeavored to utilize such facts as they knew, and to base their conclusions on their experience; but they did not realize their great need for more facts and more experience. They followed the natural tendency to draw conclusions from past experience, while the modern scientific standard requires that not conclusions, but only hypotheses, should be drawn from past experience, the conclusion to follow upon the testing of the hypothesis by new facts. In other words, a scientific conclusion is a hypothesis that has proved successful in predicting hitherto unknown facts. This reserve in accepting the suggestions of past experience, and this zeal for new facts to test definite questions, psychology had to acquire before becoming a true science. The new attitude, however, did not arise within the ranks of the philosophical psychologists, but was imported from without.

The push from outside that changed the course of psychology came from physiology, itself an ancient branch of medicine that had undergone a revolution at about the beginning of the nineteenth century, and had

split off from its parent stem, becoming distinctively and actively an experimental science. The idea that the functions of the bodily organs were to be learned by experiment took hold early in the century, and many experiments were tried on the muscles, glands, heart, nerves, and brain. Among the organs offering themselves for such study were the eye, ear, and other sense organs; and in fact they were attacked early rather than late by the physiologists, because their action could largely be studied in the human subject, without operations of a surgical nature such as are necessary in examining most of the organs. It was simply necessary, for example, to have a trustworthy observer tell what he saw when the physical conditions of vision were arranged in some definite way to test a particular question. Newton's decomposition of white light by use of the prism had been followed up by the students of natural philosophy, and about the year 1800 Thomas Young had described some very important experiments on the mechanism of the eye, and propounded a theory of color vision which still numbers many adherents. Other physicists, among whom may be mentioned Benjamin Franklin and Count Rumford, had incidentally made important observations on the eye and its sensations. In the early decades of the nineteenth century there was a great increase in the amount of work done upon the eye, and many new facts were added to the store of knowledge, while at the same time many fresh problems came into view. The invention, as the outcome of physiological experiments, of the stereoscope by Wheatstone in 1833, and of a rudimentary form of the moving picture machine by Plateau in 1832,

may be taken as illustrating the importance of the work done by the physicists and physiologists of this period in preparing the way for a science of psychology; since, evidently, the problems raised by the successful workings of these instruments—as to how, in the one case, two properly chosen flat pictures or diagrams, one placed before each eye, can create so strong an impression of solidity—and as to how, in the other case, a rapid sequence of pictures of an object in different positions can make us see the object in motion—evidently such problems are psychological.

Similar, though less extensive work was being done on the sense of hearing; and Weber, about 1825, made a number of important discoveries regarding the sense of touch and the perception of distance, temperature, and weight upon the skin. Weber is an especially notable figure in the history of psychology for his experiments on the perception of differences and the generalization he drew from them. A small difference between two weights, he found, could be observed provided the weights themselves were small; but as they were made heavier, the difference between them had to be proportionately increased in order to remain perceptible. He concluded from this and similar facts that the perception of difference in magnitude is a perception of the ratio of the magnitudes, and not of the absolute amount of difference between them. This generalization, later named 'Weber's law', came to be regarded as one of the chief corner-stones of the edifice of experimental psychology.

In view of this large growth of what was really psychological information in the hands of the physiologists,

and in view, on the other side, of the increasing tendency within the ranks of the philosophers for some to specialize in the study of mental philosophy, we might have expected a union of these two tendencies before the middle of the century into a science of the modern type. As a matter of fact, probably because experimental methods were not yet ready for an attack on the problems most interesting to the mental philosophers, such a union did not occur for another generation, though meanwhile we find the mental philosophers becoming more empirical, as evidenced by the works of Bain, and a section of the physiologists becoming more psychological, as seen especially in the case of Helmholtz. The latter, a scientific student of the first rank, worked over the whole existing stock of knowledge on vision and hearing, testing everything for himself, and adding many fresh discoveries; and summed up the whole in two great books, one on vision and one on hearing, published about the year 1860. He also, in the course of an investigation into the speed of nerve transmission, gave the first measurement of the 'reaction time', a subject of study which was at once taken up with energy by the Dutch physiologist Donders.

Another name to be mentioned along with Helmholtz is that of Fechner, a professor of physics, with varied interests, which included a somewhat mystical vein of philosophy. While ruminating over the problem of the relation of the physical and psychical worlds, he came across the work of Weber, already mentioned, on the perception of small differences in weights and other physical stimuli, and conceived the idea that this type of experiment afforded a means of establishing definite

quantitative relations between the stimulus, representing the physical world, and the resulting sensation, representing the psychical. He accordingly began extensive experimentation along this line, devised appropriate methods for conducting such experiments and for treating their results, and after years of labor published in 1860 a book which he called *Psychophysics*. Although this work has not been generally accepted as possessing the philosophical significance which its author intended and indicated by its title, it proved to be of great importance on the psychological side, because it showed the way of accurate experiment on certain psychological problems. Ten or fifteen years later, the same author applied somewhat similar methods of experiment to questions of esthetics, and proposed that a science of esthetics should be developed 'from below up', by starting with experimental determinations of preferences for colors, shapes, and other simple objects, and working up towards the complex objects of art.

The situation in 1870, then, was about this. We have the mental philosophers, best represented by Bain or by the Herbartians in Germany, disposed to devote their attention to the senses and intellect, the emotions and will, as matters deserving of study for their own sakes without regard to ulterior philosophical considerations; and on the other side we have a large and growing fund of information on the senses and sense perception, the speed of simple mental operations, and related topics, and we have a number of experimental procedures well worked out and known to be usable. The man in whom these two streams most definitely came together was Wundt. Beginning as a physiologist,

largely under the influence of Helmholtz and Fechner, but also of the philosopher Herbart, he soon switched to what he named 'physiological psychology', meaning by that term a psychology studied by the method of physiology, namely, by experiment, and taking full account of the relevant information to be had from physiology. He published a book with this title in 1874. Soon after that, he became professor of philosophy in the University of Leipzig, where he established in 1879 the first definitely recognized psychological laboratory, and began to send out pupils trained in experimental psychology to found laboratories in other universities. Many were founded in the next fifteen years, especially around 1890. It would, however, be a mistake to conclude that Wundt was the sole founder of experimental psychology; for similar beginnings were made almost simultaneously with his, at Berlin and Göttingen, and at Harvard and Johns Hopkins, by men not pupils of Wundt but influenced directly by Fechner, Helmholtz, and other physiologists.

The scope of experimental psychology in 1880 was not by any means as wide as that of mental philosophy. The physicists and physiologists had shown how to study the senses and certain sorts of sense perception and how to measure the time of simple mental operations; and there were Fechner's methods for studying esthetic preferences. There was little indication that experiment could be fruitfully applied to memory, thinking, will and emotion, or several other matters of great psychological interest; and experimental psychology accordingly appeared at first as a rather limited and technical part of the whole subject. It was not long,

however, before Ebbinghaus introduced his memory experiment, the germ of a vast amount of subsequent work. Somewhat later, American psychologists found practice and habit formation to be fruitful fields for experimental study; and, all in all, the learning process has distinctly come within the scope of experimental psychology. Mental imagery and the association of ideas have also been found amenable to experiment; also feeling and emotion; and even thinking and willing, though elusive, have been grappled with by experimentalists, not without some measure of success. In short, the experimental psychologists of the present day are not disposed to lay down their arms before any enemy; and experimental psychology, from being a specialized branch of the science, has won recognition as a method of study available throughout the whole. Not, indeed, the only good method of obtaining psychological facts, it is probably the most useful of all available methods. What modern standards require is not necessarily the use of experiment, but the use of some definite and trustworthy means of observing facts, and the checking up of any hypothesis by definite observations.

If the foregoing sketch of the origin and development of the modern movement in psychology were left as it stands, unsupplemented, it would perhaps represent the generally received view of the movement, but it would be quite misleading in important respects. It would err by the omission of certain important contributions. The new psychology did not arise wholly from the union of mental philosophy with physiology, but its origin was considerably more complex.

Almost simultaneously with Fechner's *Psychophysics* appeared (in 1859) a still greater book, Darwin's *Origin of Species*. The tremendous interest in biological evolution that followed could not fail to spread to the sphere of mental development. Darwin himself wrote on the *Expression of the Emotions in Man and Animals*, and Romanes and others early made special studies of mental evolution. At first, the facts relied upon in this line of study were of the anecdotal sort, and it remained for Thorndike, in 1899, to point out the fallacy of this kind of evidence, and to introduce the experimental study of animal intelligence, thus signaling the union of experimental psychology with the biological interest in mental development.

Evolution was concerned with the development of the individual as well as of the race; and Darwin himself made the first systematic study of the mental development of a child. Stanley Hall early made this field peculiarly his own, and a mass of observations has been accumulated which has no direct relation to experimental psychology, being controlled rather by the biological interest in evolution. Of late, however, considerable use has come to be made of experiment in the study of child psychology.

Evolution was much concerned with heredity and variation. Galton, a close associate of Darwin, deserves to be mentioned alongside of Wundt as one of the founders of modern psychology. He studied individual differences in imagery and other mental traits, collected data on the heredity of mental abilities, and sought to discover how far heredity and how far environment are responsible for the individual's peculiar character and

mentality. He introduced important methods for the study of variation and the relationships of traits. In this he has been followed by Karl Pearson and many others. For the purpose of studying mental differences, Galton introduced the conception of mental tests, thus establishing connections between experimental psychology and the biological interest. In this line he was immediately followed by Cattell, and later by a host of psychologists, as the fruitfulness of this line of study has become evident. Looking over the whole field of psychological investigation at the present time, one gets the impression that, while the dominant method of observation has been derived, as already shown, from physiology, a large share of the interests involved are to be traced back to biology and particularly the study of evolution.

Somewhat akin to the biological source of interest is the anthropological, both being concerned with mental development in the race. It was apparently the greatly increased knowledge of languages, and the discovery of close relationships between Hindu and European languages, that gave the start to this line of psychological study. Since language, it was said, is the expression of thought, the history of human thought could be traced in terms of the history of language and by the methods of comparative philology. About the middle of the last century, efforts were made by Geiger, Max Müller, Gladstone, and others, to write chapters in the history of the human mind on the basis of philology and comparative mythology. In the sixties, there was even published for several years in Germany a journal of 'folk psychology', perhaps the first scientific journal to

bear the name of psychology. The methods and presuppositions of the older folk psychologists have not stood the test of time; for language, it is now recognized, is by no means a clear and unequivocal expression of thought and consciousness, and the easy transmission of a language from one race to another makes it impossible to trace racial by linguistic history. Yet the contribution of folk psychology to the general modern movement cannot be ignored. It resembles the other factors in the total movement at least in this, that it makes its start from empirically determined facts. It embraces a great mass of data, which, when good methods are devised for their utilization, can hardly fail to enrich very greatly the science of psychology.

Yet another important contribution to the modern movement remains to be mentioned. The origin of abnormal or pathological psychology is quite independent of all the influences that have already been mentioned; and we have here another stream of influence coming from medicine.

Prior to 1791, very little scientific interest had been aroused by the insane. Neglected or confined as dangerous, they were in a deplorable condition. In this year, Pinel made the first great step in reform at the Salpétrière in Paris, by striking the chains from the inmates, as depicted in a famous painting. In other words, he diminished the amount of restraint, and sought for a more humane and rational treatment, being guided by a conception of the insane as sick people who needed medical attention rather than punishment. Thus was born a new specialty in medicine, that of psychiatry or the treatment of mental disorders. The

reform spread quickly to other countries, and gained force from decade to decade, though even today its work is not complete, since there are localities, and some even in our own country, where the treatment of the insane has not advanced much beyond the eighteenth century standard. From the psychological point of view, the important thing is that, along with the new treatment, there went a new attention to the phenomena of insanity, a recognition of different types, a tracing of the course of the disorder, and search for its origin. Along in the middle of the century, we find books written by Moreau de Tours and by Maudsley that are essentially books on abnormal psychology; and attention to this side of the matter has greatly increased of late. Within the last few decades, also, this movement has established connections with experimental psychology, till we find psychologists attached to the staff of some of the progressive hospitals for the insane.

Near the year 1800, again, we find the first trace of scientific interest in the mentally defective, who had previously been almost wholly neglected by society. Itard conceived that an idiot might be taught if only the methods of teaching were well chosen; and though his attempt was not very successful, it aroused interest and led the way to further study at the hands of physicians. Seguin, somewhat after the middle of the century, made a serious and rather successful effort to devise methods for teaching the mentally defective such things as they are capable of learning. As the result of such work, the treatment of this class by society has become much more humane and intelligent, though much remains to be done before our manner of dealing

with the defective shall reach the level of our treatment of the insane. Two points in the recent history of the matter are of special interest to us here. When Binet devised his very useful set of tests for the determination of the level of intelligence and the diagnosis of mental defect, he, once more, established connections between the experimental and the pathological streams in the modern psychological movement. And the recent development of interest in eugenics, primarily a biological problem, but spreading to psychology and especially to the question of mental defect and its heredity, has brought three streams together in what bids fair to be a very important activity.

The history of hypnotism, as of psychotherapy generally, is of interest in relation to the development of modern psychology. Without considering the various practices which, under many names in many peoples, are essentially the same as hypnotism, we may begin with the 'animal magnetism' of Mesmer. This Viennese physician, a man not without scientific bent, though the mystical element was more pronounced in his make-up, put forward about 1770 the conception (in part an old conception) that a magnetic influence passing from one person to another was capable of producing curative effects. He found this magnetism specially strong in himself, and claimed to heal by its means. Migrating to Paris in 1778, he aroused great excitement by his séances, staged much like those of a magician, in which he produced trances and convulsions in some of his more susceptible subjects, and apparently cured some ailments which would now be classed as nervous. A royal commission, including Lavoisier and

Benjamin Franklin, investigated him, and pronounced against his doctrine of animal magnetism, while leaving the question of the reality of his cures unsettled. The practice of mesmerism went on without scientific recognition, till about 1830, when a second commission, appointed this time by the Paris Academy of Medicine, investigated it and reported that some of the cures were genuine, not pronouncing on the theory of animal magnetism. Meanwhile, some of the outstanding facts of the matter, the trance state, with its high suggestibility and frequent absence of memory for it afterwards, had been definitely observed. A little later, Braid, an English surgeon, gave the first really scientific account of the condition of hypnosis, with a more rational interpretation than that of animal magnetism. From this time on, some use of hypnotism was made by nerve specialists; but it was not till the time of Charcot and Liébault, in the seventies, that the matter was thoroughly threshed out and its psychological interest emphasized. Quite a school of younger men, following Charcot, endeavored to obtain psychological information by the use of hypnosis as a method of investigation.

Charcot's name is prominent also in the history of the neuroses, hysteria especially; and his pupils, among whom Janet and Freud are noteworthy, have made very serious attempts to fathom the psychology of these baffling conditions and derive thence information for normal psychology as well; since it has been felt that these abnormal mental conditions simply show normal functions acting in an exaggerated and unbalanced way.

Of recent years, psychology has been undergoing a new influence. While the influences already mentioned

have come from the older sciences, these recent influences have come from the practical field, and consist of demands upon psychology to rise to its opportunities for practical application. The field in which psychology has been longest and most extensively applied is education. From a condition in which it simply attempted to make use of the existing conclusions of general psychology, educational psychology is developing into a condition in which it makes its own experiments to solve its own problems, and thus incidentally contributes to the general store of psychological knowledge instead of simply drawing upon it. Industrial psychology, business psychology, legal and forensic psychology have not yet reached the stage of independent development, but, in view of the strong demands they are making on the psychologist, it is likely that there will soon be specialists in these branches and that their work will contribute much of general psychological interest; and thus the currents that go to make up the psychological stream will in the future be even more numerous and varied than they are today.

With so many streams entering into it, modern psychology is itself necessarily a complex affair. In spite of its complexity, however, there is a strong tendency for the different streams to come together. They tend to come together in the matter of method, in that the method of experiment, itself diversified to meet the various demands made on it, is becoming more and more widely adopted. To a considerable degree, also, the diverse interests of psychology show a tendency to unite in a general adoption of the genetic problem as the common aim of all branches of investigation. The problems

of origin and development, obviously the main interest in child psychology and the study of mental heredity, as well as in the manifold work on the process of learning, have also come to be the chief interest in pathological psychology. We wish not only to examine the momentary state of a deluded individual and discover whether he really reasons correctly from false premises, but we wish to go behind the moment and discover how he came to accept those false premises and allow them to become so firmly fixed within him. Even within the traditional field of experimental psychology, there is an increasing tendency to examine a performance in its development rather than simply in its perfected form.

Perhaps no one has better expressed in his writings the full scope and tendency of modern psychology than the late William James. He took as his background the older mental philosophy, especially of the English associationist school, being however keenly aware of its shortcomings and of certain necessary complements to be found in the mental philosophy of the Germans. Coming into psychology from the physiological laboratory, he retained the physiological point of view, was entirely hospitable to the new experimental psychology, and very early conducted experiments of his own. He was not, indeed, especially impressed by much of the earlier experimental work of Fechner and of Wundt and his pupils, which seemed to him rather formal and pedantic and lacking in real psychological insight; and he used to speak rather depreciatingly of 'brass instrument psychology'. Yet he gave it a hearing and extracted what benefit he could from it. His interest in the problems of genetics is seen in his specially excellent

chapters on instinct and habit, and in the whole tenor of his work. With the French school of abnormal psychology he was keenly sympathetic, and he was able to find much of value in their works. All in all, he was evidently a good internationalist in his science, as indeed every good psychologist must be. Better than any other book, his great work on the *Principles of Psychology* can be taken as at once a summing up of the older psychology and an introduction to the modern point of view.

II

THE PROBLEMS AND METHODS OF PSYCHOLOGY

One curious fact about present-day psychology is that it is uncertain, or seems so, as to its proper line of study. You will find in current discussions a great deal of disagreement as to the correct aim and definition of the science, and as to the method of investigation that it ought to employ. The question of method is bound up with the question of aim. Some will tell you that the only proper aim of psychology is to reach a scientific analysis and description of consciousness, and that the method to be employed, accordingly, must be self-observation or introspection; while others will deny that consciousness can be studied scientifically or that introspection is a valid method of study, and will submit, in their turn, that the aim of psychology should be to describe human behavior, and its method the objective examination of behavior. To an outsider this unsettled state of affairs naturally appears as a sign of inherent weakness, and it is so regarded by some apprehensive psychologists. Probably it must be admitted to be a sign of immaturity; but it is a less serious symptom than at first appears. Psychologists are not marking time while these theoretical questions are discussed; but each is attacking the problem that appeals to him by the method adapted to that problem. After all, though attempts to define the scope of a science are not without

value, they are not fundamental. A science does not take its start from a definition, as if its task were assigned to it by some higher authority, but it proceeds from problem to problem, often taking unexpected turns as the knowledge gained opens vistas of knowledge still to be sought. The best definition of a science, at any time, would be derived by induction from the work already accomplished in it, together with the problems offering a fair prospect of solution. Obtained in this way, the definition of current psychology would make mention of both consciousness and behavior, since both are being fruitfully and hopefully studied.

Let us see what the study of consciousness comes to in practice. It is clear that the field of consciousness includes not only emotions and ideas, but also sense experience, and, in fact, most progress has been made in the study of sensory experience, because of the fact that it can be aroused at will by appropriate physical stimuli, and thus readily made the object of experimental study. The first step in a description of sensation has been classification, the grouping of the various sensory experiences according to their likenesses and differences. Thus, within the domain of light sensations, we can distinguish a chromatic or color group from the colorless black-white-gray group, and within the domain of sound we distinguish tones and noises. Exploration of the skin reveals pressure, warmth, cold, and pain sensations; and exploration of the sense of smell enables us to distinguish, rather roughly perhaps, eight or ten classes of odors.

A second step in the description of sensations can be taken in some cases only; it consists in the arrangement

of a group of sensations in a definite order according to their degrees of resemblance. The tones can be arranged in order from high to low, the colors in order from red, through orange, yellow, greenish yellow, green, bluish green, blue, violet, and purple, back to red again. Any class of sensations can be arranged in the order of their intensity, as colors from bright to dark, tones from loud to soft, odors from strong to faint. Evidently this arrangement in order, where it can be carried out, is much more satisfactory as a description than the mere separation into disconnected classes.

A third step in the description of sense experience is analysis, of which a good example is afforded by the tastes. We commonly assign a distinct taste to almost every article of food, but the simple experiment of holding the nose while tasting proves that most of these characteristic flavors are really additions to taste proper contributed by the sense of smell. Coffee and a solution of quinine, apple pulp and onion pulp, cannot be told apart when the nose is held, their differences being really in odor and not in taste proper. Such flavors are therefore compounds. But sweet, sour, bitter, and salty are true tastes, not abolished by excluding the sense of smell; and, moreover, no effort to analyze them has been successful, so that they are accepted as the elementary tastes. Other similar analyses have been successfully made, especially in the realm of tones. Descriptive psychology aims to discover all the elementary sensations and to show which of them enter into each compound of sensations; in other words, it seeks to accomplish something similar to the work of analytical chemistry.

A fourth step in the descriptive psychology of sensation is to examine the modes of combination of the elements. Two such modes may perhaps be recognized, the blends and the patterns. When two or more sensations blend, the compound is a sensation of the same general sort as the elements, and appears, indeed, at first inspection to be an element, though properly directed attention may be able to pick out of it its constituent parts. The taste of lemonade is a blend of sweet, sour, lemon odor and cold; but to the one who is drinking, it is usually just the taste of lemonade, no more and no less. A pattern is a combination in which the constituents retain their individuality, or much of it, because they exist side by side in space, or one after the other in time; while, nevertheless, the combination has a certain unity, a specific character of its own, not of the same general sort as that of its constituents. A number of bits of color side by side give a pattern; and the pattern has a specific character; but we should not think of calling the pattern itself a color, as we call the blend of tastes a taste. A melody is a pattern; and a still better example is a heard word, composed of vowel and consonantal sounds in a certain order, but heard as a unit.

As can be seen from the foregoing sketch of the work accomplished in describing sensory experience, considerable progress has been made in this particular problem. A similar problem is the description of the conscious processes of memory, imagination, thinking, emotion, etc., but here the undertaking has been found much more difficult, partly because individuals differ much more here than in sensation, and partly because the

processes cannot be aroused with the same certainty when desired and thus are not so subject to experimental control. Good work has been done on mental imagery, and suggestive beginnings have been made in a description of the conscious process of thinking; but, on the whole, progress has been relatively slow, and there is much disagreement as to the proper interpretation of the results thus far obtained.

Casting our eye over the results and prospects of psychology considered as a study of consciousness, the doubt arises whether this is, after all, the psychology that we came out to see. It is impossible, indeed, that a description of consciousness, however perfect, should fully satisfy the psychological interest and curiosity. It cannot pretend to tell us all we wish to know of mental life and performance. Its most obvious deficiency lies in the fact that mental processes are not entirely conscious, so that consciousness gives but a fragmentary picture of the real course of events in perceiving, remembering, thinking, or acting. A few instances will make this plain. An act, at first unfamiliar and executed with consciousness of its several parts, becomes with repetition fluent and automatic, and attended by little consciousness. What shall we do in such a case? Shall we let the psychologist study the doing of the unfamiliar act, but turn over the study of the well-trained act to some other science, as physiology? This would be an ill-conceived division of labor, since it would prevent the genesis of the well-trained act from being followed and understood. Again, any complex mental act, though partly in clear consciousness, is in part only dimly and in part not at all conscious; yet

certainly the act should be studied as a whole. To confine our attention to consciousness would be like describing the shifting views of the kaleidoscope, without any consideration of the action of the machine. Though entertaining, it would be, on the whole, rather trifling.

Another difficulty with psychology conceived as the science of consciousness has been felt most keenly by the students of animal psychology. A science should be based on as direct observations as possible, while the animal psychologist was in the unsatisfactory position of being entirely unable to observe the animal consciousness directly. This would not be so bad if he had the means of inferring the consciousness of the animal with any certainty from its actions; but such inferences are based wholly on analogy and not on logically sound premises. We observe the animal behaving in a certain manner, and reason that if we behaved in such a way in similar circumstances, our conscious experience would be thus and so; and therefore the animal's consciousness must be thus and so. But this is no sure inference, since the major premise that it requires, to the effect that such an act is always attended by such consciousness, could not be known to be true except by observation of the consciousness of animals attending their acts. Aside from this logical difficulty, there is in detail very great chance of error when animal behavior is interpreted anthropomorphically. The animal psychologist is confronted by a dilemma: if he would produce psychology, he is told that he must describe the consciousness of animals; but if he attempts to do so, he ceases to be scientific. Meanwhile, he is perfectly aware within himself that he is making scientific observations on the

actions of animals, and that the actions he is studying are in the same general class as the mental accomplishments of men, though less elaborate.

Let us examine for a few moments the character of the work done by the animal psychologists. Of recent years it is almost wholly carried on by experimental methods.

One line of study has been concerned with the instinctive or native powers of different animals. Spalding sought to discover whether flight was instinctive in birds, by taking the young, just hatched, and confining them in little boxes too narrow to allow them to stretch their wings and so constructed that the little bird could not see out and possibly learn from the sight of older birds flying. He kept the birds in good condition in these boxes till the age at which the young of that species normally begin to fly, and, on then releasing them, found that they flew promptly and well, steering and avoiding obstacles as cleverly as could be desired. Evidently, flight was not learned but instinctive.

Thorndike placed a newly hatched chick on a platform at varying distances from the ground, and found the chick to hop down without hesitation when the elevation was small, with hesitation and spreading of the wings when the elevation was medium, and not at all when it was great, thus showing an innate sense of distance, a reaction to the third dimension.

Scott brought up young Baltimore orioles without giving them any opportunity of hearing the song of older birds of their kind, and found that the young developed songs of their own, not identical with those common to the species; he concluded, therefore, that

the particular song of the species was not determined by innate tendencies, but was learned by the young from the older birds, and handed down from generation to generation.

Another line of study in animal psychology has been concerned with the intelligence, or ability to learn, of various animals. A typical instance is afforded by Thorndike's puzzle-box experiment on cats and dogs. A hungry cat was placed in a box or cage, through the slats of which it could see or smell a bit of food placed outside. The door of the cage could be opened from inside by turning a button or operating some other simple catch. The cat immediately began vigorous efforts to get out to the food. It tried to squeeze between the slats, bit or clawed at anything loose, and, in the course of these varied attempts, hit upon the catch, opened the door and got its food. On a fresh trial, the cat went through the same style of performance; but on repeated trials its time gradually decreased by elimination of more and more of the useless movements, till finally it reacted to the situation by going straight to the catch and opening the door; and in further trials it continued to react in this way, showing that it had learned the trick. Something of its manner of learning it could be inferred from its behavior. It gave no sign of any internal process of working the thing out, for it was in constant motion, passing impetuously from one feature of the cage to another that aroused its tendencies to react. Moreover, the process of learning was gradual, as shown by the times of successive trials, and seemed to consist in the gradual weakening and elimination of those tendencies to react that

resulted in failure and the gradual strengthening of those tendencies that resulted in success, without any sudden transition from blind 'trial and error' to correct orientation. The transition came, but not all at once, as happens when a human being suddenly sees into the problem.

Similar experiments with puzzle-boxes, and also with mazes, or paths to be learned, have been tried on many species of animals, with the object of discovering whether all animals have some power of learning, the speed of learning and the difficulty of the problem that can be mastered by each species, the influence of age on quickness of learning, the best manner of teaching the animal, whether imitation provides a means of learning additional to trial and error, how long what has been learned is retained, and what parts of the brain are concerned in the performance of learned acts.

Another line of work is concerned with the senses and sense discrimination of animals. Experiments on this question are also usually experiments in learning, the question reducing itself to this, whether the animal can learn, for example, to react differently to two colors. Suppose a cat is to be tested as to its power of distinguishing blue from gray. It is placed before two doors, one bearing a blue spot and the other a gray. When it opens the blue door it finds food, but the gray door yields it nothing or perhaps even punishment of some sort. The blue and gray signs are frequently interchanged, so that the cat cannot be guided by position. In a series of trials, however, the cat probably learns to choose the door with the blue sign quite regularly, showing that it can discriminate in reaction between the two stimuli used. But what it is reacting to may be a

difference of brightness rather than of color. To test this question, once the reaction to the blue is well established, the gray is gradually made brighter or darker; and it is found, as a matter of fact (by Cole), that a gray can be found of such brightness that the cat no longer reacts regularly to the blue, but goes to either the blue or the gray door by chance. The probability is, from work of this kind, that cats and dogs and a large share of animals do not have the power of color discrimination, *i.e.*, the power of reacting differently to light according to its wave length. The hen, on the other hand, is keenly sensitive to differences of wave length, and this is very likely true of birds in general. The monkeys also seem to discriminate colors.

It is clear that the observations of the animal psychologist are objective, and that his results are directly facts in the behavior of the animals, in their reaction to stimuli. Also, it is plain that generalizations in terms of behavior can be drawn from such observations, and have been drawn. Consequently animal psychology can fairly claim to be scientific. Can it claim to be psychology? Well, it is engaged in the study of instinct, learning, discrimination, matters that the student of the human mind must also consider. Only, it is not engaged in the study of consciousness. It was to be expected, in this state of affairs, that the animal psychologist, on turning his attention back to human or general psychology, should query whether after all the real goal of the science was not the study of behavior, human as well as animal. The most radical of them[1] are

[1] As Watson in *Behavior; An Introduction to Comparative Psychology*, New York, 1914.

for excluding altogether the study of consciousness, and, as they conceive it, throwing overboard the whole, or nearly the whole, of the human psychology thus far achieved, with its concepts and terminology, and making a fresh start. They would take animal psychology as the model, the objective method as the exclusive means of observation, and make the scientific description of reactions to stimuli the goal of all psychology.

This sounds revolutionary, but is really less revolutionary than it sounds. Psychology has not by any means waited till the present time before beginning studies of human behavior, nor have the consciousness psychologists ever had things all their own way. Summing up in 1904 the convictions that had guided him for two decades of investigation and teaching, Cattell expressed himself[1] as follows:

"I am not convinced that psychology should be limited to the study of consciousness as such . . . . There is no conflict between introspective analysis and objective experiment—on the contrary, they should and do continually cooperate. But the rather widespread notion that there is no psychology apart from introspection is refuted by the brute argument of accomplished fact. It seems to me that most of the research work that has been done by me or in my laboratory is nearly as independent of introspection as work in physics or zoology."

Though few had given expression to this view of psychology when attempting to define it, a large share

[1] At the International Congress of Arts and Sciences in St. Louis, printed in the Report of the Congress, and in the *Popular Science Monthly* for December, 1904.

of all the experimental work done from the time of Fechner down is virtually work on human behavior, and only incidentally, if at all, on consciousness. A very typical form of experiment has been the assignment of a task and the measurement of the success with which the task was performed; with variation of the conditions and observation of the resulting change in the performance of the task. Fechner's own work in the perception of small differences was of this sort, though he chose to interpret it in a somewhat strained manner; and the same may be said of a large share of the subsequent work on psychophysics. Reaction time work is of this sort, and has frequently been criticised by the more enthusiastic introspectionists on the ground that it has failed to give a description of consciousness. The same can be said, emphatically, of most of the great mass of work on memory and practice. Finally, studies of individual differences, heredity, mental development and abnormal conditions have, with few exceptions, been carried out by objective methods and have consequently yielded results on behavior rather than on consciousness. It is true that introspection has sometimes, and of late years to an increasing degree, been combined with the objective determinations; and it is also true that the results of the objective determinations have often been stated in terms of conscious experiences, rather than purely in terms of the objective conditions and the motor reaction; but the task would not be difficult to clear away all this introspective and interpretative material, and write a psychology, on the basis of results already obtained, that should be strictly

a science of behavior. And it would not be so meager a body of knowledge, either.

The question remains whether it would be desirable to do this—whether the extreme behaviorists are on the right track in demanding that all introspection and all attempt to describe conscious processes should be swept away. Their objection is primarily directed against the introspective method, which they regard as untrustworthy. It may be worth our while, before attempting to answer the question, to examine this form of observation for a few moments.

Introspection may be defined as the direct observation by an individual of his own mental processes or of the impressions made upon him by external things. It is a form of observation that only the individual himself can make. In practice, there are two quite different forms of introspection. The simpler case is that in which the subject is asked to observe and report the impressions made upon him by external things. You show him, for example, two colors, and ask him which appears the brighter, or it may be the more agreeable. He has a single task to perform, and one which is essentially the same as in objective observation. There is little difference between being asked, "Which of these two colors is the brighter?" and "Which gives you the impression of greater brightness?" In the one case you are supposed to recognize the external fact, and in the other to observe your sensory response to the external fact, but the two come to the same thing in most cases. The only difficulty arises when the observer uses 'secondary criteria' of the external fact, and thus judges it without taking account of his impressions of

brightness; but such difficulties should be avoided by excluding the possibility of secondary criteria, since it is practically impossible to prevent the subject from being influenced by them if they are present. With this difficulty avoided, no difference remains in practice between this simple form of introspection and ordinary objective observation, and no reason remains for using the special term, 'introspection', in referring to this sort of observation.

The more complex sort of introspection occurs in observing inner mental processes. Here the subject has a double task, to carry on the mental operation and to observe it. Since it is difficult and often impossible to perform this secondary task of observation along with the primary task, the only practicable way of getting an observation is first to perform the primary task, and then without delay to turn about and observe what has just passed through your mind. If the mental process is that of solving a problem, first solve your problem, devoting your whole attention to it, and then cast a backward glance over the process and notice what passed through your mind. If the process is of only a few seconds' duration, the backward glance at its close often recovers a good share of it—or so it seems to the subject. But, at best, this form of observation is more difficult than most others that are admitted in scientific work.

Now the behaviorists are perhaps not serious in demanding that the first form of introspection be abandoned, though they appear to say so. If it were discarded, visual after-images, difference tones, and many other so-called 'subjective' sensations would have to

be dismissed, since they are, as yet, known to us only from introspection. The complex form of introspection could with more approach to justice be ruled out; yet even from it some results have come with such regularity that they command general assent, and probably even the extreme behaviorists in their hearts believe them. The clearest instance would be the becoming automatic and relatively unconscious of an habitual act; but there is much other testimony regarding the processes of learning and the simpler sorts of thinking that is given with such agreement by different observers, and fits so well together, that it can scarcely be rejected by one who takes the trouble to examine it carefully.

But if the extreme behaviorist errs by wishing to exclude from psychology a legitimate method and object of study, the extreme introspectionist, who would exclude the study of behavior by objective methods, is equally at fault. The majority of psychologists are disposed to give their blessing to both groups of enthusiasts, and to hope that each group may meet with great success in attacking its chosen field. Meanwhile, it seems that neither party has rightly envisaged the real problem of psychology.

A beginner in psychology, approaching the subject from the side of common interests and unworried as yet by controversies within the ranks of psychologists, would be inclined to suppose that the aim of the science was fairly clear, and to express it as an attempt to understand the 'workings of the mind'. He wishes to be informed how we learn and think, and what leads people to feel and act as they do. He is interested, namely, in cause and effect, or what may be called dynamics.

This is not only the commonsense point of view, but also the point of view that is most in evidence in the history of psychology. Locke, one of the prime movers in psychological study, expressed himself as designing to give "some account of the ways whereby our understandings come to attain those notions of things we have"[1]; Berkeley, in his *Essay towards a New Theory of Vision*, begins by saying, "My design is to show the manner wherein we perceive by sight the distance, magnitude and situation of objects"; and Hume hoped, as he expressed it in his *Inquiry Concerning Human Understanding*, to discover, at least in some degree, the secret springs and principles by which the human mind is actuated in its operations, just as Newton had "determined the laws and forces, by which the revolutions of the planets are governed and directed." Even in recent years, while psychology has usually been formally defined as the descriptive science of consciousness, the actual interests of psychologists, as revealed by the problems taken up, have centered on this problem of cause and effect.

What is meant by a study of cause and effect—since we no longer hope to discover ultimate causes—is an attempt to gain a clear view of the action or process in the system studied, both in its minute elements and in its broad tendencies, noting whatever uniformities occur, and what laws enable us to conceive the whole process in an orderly fashion. Now neither consciousness nor behavior provides a coherent system of processes for causal treatment. Consciousness is not a coherent system, because much of the process that is

[1] *Essay Concerning Human Understanding*, Book I, Chap. I, Sect. 2.

partly revealed in consciousness goes on below the threshold of consciousness; and behavior, considered as a series of motor reactions to external stimuli, is incoherent because it leaves out of account the process intervening between the stimulus and the reaction. Nor do consciousness and behavior taken together provide a coherent system, since much of the internal process intervening between stimulus and reaction is unconscious. We shall undoubtedly have to look to brain physiology for a minute analysis of the process; but until brain physiology is able to give us such an analysis, and probably even after it has done so, we shall derive some satisfaction from the coarser analysis which we can derive from the introspective and behavioristic methods of psychology. But the essential thing is to keep the dynamic point of view, and to be working always toward a clearer view of the mental side of vital activity, refusing to be contented with the fragmentary views offered us by the exclusive students of either consciousness or behavior, but endeavoring to utilize the results of both these parties, and the results of brain physiology as well, for an understanding of the complete processes of mental activity and development.

Once the point of view of a dynamic psychology is gained, two general problems come into sight, which may be named the problem of 'mechanism' and the problem of 'drive'. One is the problem, how we do a thing, and the other is the problem of what induces us to do it. Take the case of the pitcher in a baseball game. The problem of mechanism is the problem how he aims, gauges distance and amount of curve, and coordinates

his movements to produce the desired end. The problem of drive includes such questions as to why he is engaged in this exercise at all, why he pitches better on one day than on another, why he rouses himself more against one than against another batter, and many similar questions. It will be noticed that the mechanism questions are asked with 'How?' and the drive questions with 'Why?' Now science has come to regard the question 'Why?' with suspicion, and to substitute the question 'How?' since it has found that the answer to the question 'Why?' always calls for a further 'Why?' and that no stability or finality is reached in this direction, whereas the answer to the question 'How?' is always good as far as it is accurate, though, to be sure, it is seldom if ever complete. It may be true in our case, also, that the question of drive is reducible to a question of mechanism, but there is *prima facie* justification for making the distinction. Certainly the motives and springs of action of human life are of so much importance as to justify special attention to them.

This distinction between drive and mechanism may become clearer if we consider it in the case of a machine. The drive here is the power applied to make the mechanism go; the mechanism is made to go, and is relatively passive. Its passivity is, to be sure, only relative, since the material and structure of the mechanism determine the direction that shall be taken by the power applied. We might speak of the mechanism as reacting to the power applied and so producing the results. But the mechanism without the power is inactive, dead, lacking in disposable energy.

In some forms of mechanism, such as a loaded gun, stored energy is present, and the action of the drive is to liberate this stored energy, which then does the rest of the work. This sort of mechanism is rather similar to that of a living creature. The muscles contain stored energy, which is liberated by a stimulus reaching them, the stimulus that normally reaches them being the 'nerve impulse' coming along a motor nerve. The nerve drives the muscle. The nerve impulse coming out along a motor nerve originates in the discharge of stored energy in the nerve cells controlling this nerve; and these central cells are themselves excited to discharge by nerve impulses reaching them, perhaps from a sensory nerve. The sensory nerve drives the motor center, being itself driven by a stimulus reaching the sense organ from without. The whole reflex mechanism, consisting of sense organ, sensory nerve, center, motor nerve and muscle, can be thought of as a unit; and its drive is then the external stimulus.

If all behavior were of this simple reflex type, and consisted of direct responses to present stimuli, there would be no great significance in the distinction between drive and mechanism. The drive would simply be the external stimulus and the mechanism simply the whole organism. On the other hand, what we mean by a 'motive' is something internal, and the question thus arises whether we can work our way up from the drive as external stimulus to the drive as inner motive.

The first step is to notice the physiological facts of 'reinforcement' or 'facilitation' and of 'inhibition'. These mean, in neural terms, the coming together of different nerve impulses, with the result in some cases

that one strengthens the other, and in some cases that one weakens or suppresses the other. Take the familiar 'knee-jerk' or 'patellar reflex' as an example. This involuntary movement of the lower leg, produced by some of the thigh muscles, can only be elicited by a blow on the tendon passing in front of the knee (or some equivalent, strictly local stimulus). But the force of the knee-jerk can be greatly altered by influences coming from other parts of the body. A sudden noise occurring an instant before the blow at the knee will decidedly reinforce the knee-jerk, while soft music may weaken it. Clenching the fist or gritting the teeth reinforces the knee-jerk. The drive operating the knee-jerk in such cases is not entirely the local stimulus, but other centers in the brain and spinal cord, being themselves aroused from outside, furnish drive for the center that is directly responsible for the movement. If one nerve center can thus furnish drive for another, there is some sense in speaking of drives.

Still, the conception of 'drive' would have little significance if the activity aroused in any center lasted only as long as the external stimulus acting upon it through a sensory nerve; for, taken as a whole, the organism would still be passive and simply responsive to the complex of external stimuli acting on it at any moment. It is therefore a very important fact, for our purpose, that a nerve center, aroused to activity, does not in all cases relapse into quiescence, after a momentary discharge. Its state of activity may outlast the stimulus that aroused it, and this residual activity in one center may act as drive to another center. Or, a center may be 'sub-excited' by an external stimulus

that is not capable of arousing it to full discharge; and, while thus sub-excited, it may influence other centers, either by way of reinforcement or by way of inhibition. Thus, though the drive for nerve activity may be ultimately external, at any one moment there are internal sources of influence furnishing drive to other parts of the system.

This relationship between two mechanisms, such that one, being partially excited, becomes the drive of another, is specially significant in the case of what have been called 'preparatory and consummatory reactions' (Sherrington). A consummatory reaction is one of direct value to the animal—one directly bringing satisfaction—such as eating or escaping from danger. The objective mark of a consummatory reaction is that it terminates a series of acts, and is followed by rest or perhaps by a shift to some new series. Introspectively, we know such reactions by the satisfaction and sense of finality that they bring. The preparatory reactions are only mediately of benefit to the organism, their value lying in the fact that they lead to, and make possible, a consummatory reaction. Objectively, the mark of a preparatory reaction is that it occurs as a preliminary stage in a series of acts leading up to a consummatory reaction. Consciously, a preparatory reaction is marked by a state of tension.

Preparatory reactions are of two kinds. We have, first, such reactions as looking and listening, which are readily evoked when the animal is in a passive or resting condition, and which consist in a coming to attention and instituting a condition of readiness for a yet undetermined stimulus that may arouse further response.

The other kind consists of reactions which are not evoked except when the mechanism for a consummatory reaction has been aroused and is in activity. A typical series of events is the following: a sound or light strikes the sense organ and arouses the appropriate attentive reaction; this permits a stimulus of significance to the animal to take effect—for example, the sight of prey, which arouses a trend towards the consummatory reaction of devouring it. But this consummatory reaction cannot at once take place; what does take place is the preparatory reaction of stalking or pursuing the prey. The series of preparatory reactions may be very complicated, and it is evidently driven by the trend towards the consummatory reaction. That there is a persistent inner tendency towards the consummatory reaction is seen when, for instance, a hunting dog loses the trail; if he were simply carried along from one detail of the hunting process to another by a succession of stimuli calling out simple reflexes, he would cease hunting as soon as the trail ceased or follow it back again; whereas what he does is to explore about, seeking the trail, as we say. This seeking, not being evoked by any external stimulus (but rather by the absence of an external stimulus), must be driven by some internal force; and the circumstances make it clear that the inner drive is directed towards the capture of the prey.

The dog's behavior is to be interpreted as follows: the mechanism for a consummatory reaction, having been set into activity by a suitable stimulus, acts as a drive operating other mechanisms which give the preparatory reactions. Each preparatory reaction may be a response in part to some external stimulus, but it is facilitated by

the drive towards the consummatory reaction. Not only are some reactions thus facilitated, but others which in other circumstances would be evoked by external stimuli are inhibited. The dog on the trail does not stop to pass the time of day with another dog met on the way; he is too busy. When an animal or man is too busy or too much in a hurry to respond to stimuli that usually get responses from him, he is being driven by some internal tendency.

'Drive' as we have thus been led to conceive of it in the simpler sort of case, is not essentially distinct from 'mechanism'. The drive is a mechanism already aroused and thus in a position to furnish stimulation to other mechanisms. Any mechanism might be a drive. But it is the mechanisms directed towards consummatory reactions—whether of the simpler sort seen in animals or of the more complex sort exemplified by human desires and motives—that are most likely to act as drives. Some mechanisms act at once and relapse into quiet, while others can only bring their action to completion by first arousing other mechanisms. But there is no absolute distinction, and it will be well to bear in mind the possibility that any mechanism may be under certain circumstances the source of stimulation that arouses other mechanisms to activity.

The inadequacy of either the consciousness or the behavior psychology, in their narrower formulations at least, is that they fail to consider questions like these. Their advantage as against a dynamic psychology is that they are closer to observable phenomena. Behavior we can observe, consciousness we can observe with some difficulty, but the inner dynamics of the men-

tal processes must be inferred rather than observed. Even so, psychology is in no worse case than the other sciences. They all seek to understand what goes on below the surface of things, to form conceptions of the inner workings of things that shall square with the known facts and make possible the prediction of what will occur under given conditions. A dynamic psychology must utilize the observations of consciousness and behavior as indications of the 'workings of the mind'; and that, in spite of formal definitions to the contrary, is what psychologists have been attempting to accomplish since the beginning.

III

NATIVE EQUIPMENT OF MAN

An adult individual, whom we may imagine standing before us for examination, contains within himself a large assortment of possible activities. We know that if we show him familiar objects, he will recognize and name them; that if we ask him suitable questions, he will understand and answer; that if we set him suitable tasks, he will perform them; that anger or embarrassment or amusement can be awakened in him by appropriate means; that he can walk, jump, move his eyes, breathe, eat, digest, and, in short, display a large repertory of accomplishments. He is equipped with a whole machine-shop of mechanisms for accomplishing this variety of results. We know, however, that he will not behave in a purely machine-like manner. He may refuse to answer some of our questions; he may object to being detained for further examination, on the plea that he has business of his own to attend to; and if we follow him through the day, we shall observe him at one time start out in quest of food, at another in quest of friends, at another to seek rest. We shall observe him devoting hours of attention and effort to such apparently unstimulating objects as columns of figures or rows of potato plants. He evidently contains within himself a variety of driving forces, as well as a variety of mechanisms to be driven.

Finding the adult individual thus equipped, we wish to know how the equipment was obtained, how much

of it was provided by nature and heredity, and how much has been added by the individual's own efforts and experience. We wish to make a distinction similar to that which we make when we say that the color of a man's eyes, or the shape of his nose, is a native trait, while the tan on his cheeks and the calluses on his palms are acquired. It is not always easy to tell whether a given bit of equipment is native or acquired. If it functions from birth on, as in the case of breathing, it is of course native. If it begins to function at a certain period after birth, even when conditions have been so controlled that no chance has been afforded for acquiring it through experience, as in Spalding's experiment on the flight of birds, it is native. Very often it is impossible to apply either of these tests, and then we are driven to the use of a third, less direct criterion. Where the members of a species or other natural group are either more alike or more different in any respect than can be accounted for by their individual experience, we have reason to believe that the likeness or difference in their traits is due to the native factor. Thus cats are more alike in their propensity to hunt mice than can be accounted for by their experiences; while, on the other hand, some cats are better mousers than others to a greater degree than we can explain by differences in their bringing up; we conclude accordingly that cats are natural mousers, but that some of them are naturally better mousers than others. Of course, experience will affect a cat's behavior towards mice, but not to such a degree, probably, as would account for the likeness and differences which we find.

Language affords another good example. Men as a race are so much different from animals that we have reason to speak of a native aptitude for speech common to all men. Yet men are not absolutely alike in this function, since different languages are spoken in different localities, and since, in the same locality, some individuals use language much better than others. Now the different languages of different groups of men are handed on from generation to generation, and are accordingly explained, in any generation, by the different training and tradition. But the fact that the members of any community differ in their mastery of the language of that community cannot be altogether explained by differences of training, but must mean that individuals differ in the degree of their native aptitude for language. The uncertainty of this third criterion of native equipment is obvious: it requires an evaluation of the possible effect of training and experience, and this requires knowledge and good judgment, and may at best only give us probabilities. We can be certain, however, that there are differences between men in native aptitude; for whenever a number of individuals subject themselves for a long time to special training in a particular line, such as typewriting, it is found that, in spite of great improvement by all, great differences remain in their final performance. When experience has thus done its utmost to make men alike, they remain different; and we might add that when experience has done its utmost to make men different, they often remain surprisingly alike in some fundamental respects. There must therefore be native equipment common to men, as well as native equipment differing from one individual to another.

The new-born baby, without learning of any sort, has the use of his heart, lungs, stomach, intestines, liver, kidneys, and in short of all of his internal organs. He also uses all his muscles, bends and extends his limbs, moves his trunk, head, and eyes in all directions, and makes complex and skilful movements of lips, jaws, tongue, throat, and larynx. He possesses, as part of his native equipment, not only the mere power of muscular action, but the fundamental coordinations of muscular action. These fundamental coordinations are provided by what are called the 'lower' nerve centers in the cord and brain stem; and it appears that the organization of these lower centers is provided by nature. Native equipment includes also the use of the sense organs. The child cannot be said to learn to see or hear, nor to acquire the power of seeing red and blue, or that of hearing high and low tones, by training and experience. Given the proper stage in the natural development of the visual apparatus, and given the proper external stimulus, and the child sees red simply because he is made that way; or, if he chances to belong to that minority of male children who are born color blind, he does not see red because he is born that way.

Thus, the fundamentals of sensation, motion, and organic function are to be entered in the column headed 'native equipment'. There is still more to go there.

Not only does nature provide for the reception of stimuli from outside, and for the production of movements, but for the linking of certain movements to certain stimuli. The nerve mechanism that arouses a group of muscles to a coordinated movement is itself so connected to the nerve leading in from a certain sense

organ as to be aroused by a stimulus acting on that sense organ. The sensory mechanisms and the motor mechanisms are geared together into sensori-motor mechanisms, and many such belong under the head of native equipment. Swallowing, which occurs from birth on, is a reaction of certain muscles to the stimulus of liquid or soft substance in the mouth; sneezing is a reaction of certain other muscles to an irritating stimulus within the nose. The numerous and varied native reactions can be grouped or classified according to the function or use which they subserve.

There is a group of food-getting reactions: sucking, chewing, swallowing, spitting out anything bitter, moving the head from side to side in search of the nipple, crying when hungry. In many, if not all animals, food-seeking activities on a larger scale are provided by nature, and often spoken of as the 'hunting instinct'. In the child this type of reaction does not appear very clearly, but perhaps because of the highly domesticated condition of the young human animal.

A second group covers the danger-avoiding reactions. The simplest of these is the pulling away of the hand or foot when it is burned, pricked, or pinched. Squirming of the body appears in the new-born infant in response to similar stimuli. Coughing and sneezing, winking when a foreign substance touches or approaches the eye, are analogous reactions of other members. More general protective reactions include dodging, crouching, huddling, and especially flight. The simpler danger-avoiding reactions, if unsuccessful, give way to flight, the most energetic and efficacious reaction of the group.

Somewhat similar in function is the group of reactions against falling or other disturbances of bodily equilibrium, for which there is a special sense organ in the inner ear. Resistance to impressed movements, or to external restraint, that is to say, to being pushed or pulled, held or impeded in one's own movements, is also a natural type of reaction. Even the young child shows, in these ways, a germ of independence.

Swimming, crawling, jumping, walking, trotting, galloping, climbing, flying, or some form of locomotion, is part of the native equipment of every animal except man; and the probability is that, in man as well, creeping, walking, running, and perhaps climbing, are not really learned, but simply come into function when the native mechanisms providing for them have reached the necessary stage of natural growth.

The new-born child gives evidence of native ability to operate his vocal cords. He can vocalize, and a little later, before he shows signs of learning from others, he comes to make a variety of vowel and consonantal sounds. He even makes simple combinations of vowel and consonant, such as 'ma-ma' and 'da-da', before he really begins to imitate the speech of others. Thus the motor elements of speech are part of his native equipment. Crying, weeping, sobbing, frowning and scowling, smiling and laughing, are all primarily native reactions.

A variety of exploratory reactions are provided by nature. The simplest are the turning of the eyes toward an object seen in indirect vision, the pricking up of the ears in animals and the turning of head and eyes in men as well as animals in response to a sound, and the feeling

of an object with the hands and carrying it to the mouth. With these belong also the approaching of an object that has aroused curiosity. Closely related to the exploring reactions are those of manipulation, and experimenting with things to see how they behave. We have in this group of reactions the germ of the activities that lead to knowledge.

When a child or young animal is fresh and well, it is not sparing of muscular activity, but goes through a variety of movements with no apparent stimulus or object in view. Probably slight stimuli are present, but it may at least be said to be part of the native equipment to be active in a motor way, as well, indeed, as in the way of exploration. Activity leads after a time to fatigue, and rest and sleep may properly be included among the native reactions.

There are also several classes of more complex reactions that are called out by other persons. Individuals of the opposite sex act as stimuli, especially in youth, to display and courtship, and quite a variety of reactions, differing according to the species. Since the animal or human being is not responsive to this class of stimuli till he reaches sex maturity, his behavior then includes much that has been learned, but there can be no doubt that the fundamentals are provided by nature. The reaction of the young mother to her little babe is the strongest instance of a protective reaction toward the young and helpless that appears in some degree in both sexes.

Herding together and playing together are typical instances of reactions to be classed under the gregarious instinct. When children, or adults, are together, we see

also a tendency to become the leader, if possible, or to follow the leader when dominance has been established. These tendencies are probably instinctive rather than derived wholly from individual experience.

We see also certain negative reactions towards the social group or some members of it, namely, embarrassment, shyness, and fighting.

Closely connected with these native or instinctive reactions are the bodily and conscious states called *emotions*, and these also must be included under the head of native equipment. For it is quite evident that fear, anger, grief, mirth, lust, and the other emotions do not arise in the individual as the result of training. He learns to be afraid of certain objects, but he does not learn how to be afraid. All he needs, in order to be afraid, is to receive the proper stimulus, and then he is afraid by force of nature.

The close connection of the emotions with certain overt reactions, such as flight, fighting, laughing or crying, and also with certain internal bodily changes, such as quickened heartbeat and breathing, flushing or paling of the skin, has long been a matter of common observation, but the exact nature of the connection has not been at all obvious. The overt act has been usually thought of as the effect of the emotion, and the internal bodily changes, along with facial movements, have been conceived as 'expressing' the emotion. About thirty years ago, James proposed, and also Lange, to regard the conscious state of emotion as secondary to the bodily reaction, and especially to the internal part of it. Thus the emotion of fear would be a blend of sensations set up by the internal bodily changes, these being produced

directly by the perception of danger. The perception of danger would arouse the internal bodily changes, and the sensations set up by these bodily changes, blending together, would make up the conscious state of fear. This view of the emotions, called the James-Lange theory, has been the subject of a vast amount of discussion, and is still to be regarded as a hypothesis deserving of careful consideration rather than as an accepted conclusion. But there can be no doubt, I believe, that sensations caused by the bodily changes form part, at least, of the conscious emotion.

The relation of the bodily changes and the emotion has come into much clearer light through recent physiological studies. Every one knows that the sight of food makes a hungry man's saliva flow; and experiments have shown that it also starts the secretion of the gastric juice. Thus an internal condition of readiness for the food is aroused along with the desire to eat it. More surprising, perhaps, is the fact discovered by Cannon [1] by the use of the X-rays, that fear or anger is attended by a prompt cessation of the churning movements of the stomach, as it is attended also by stopping of the flow of the gastric juice. In fact, the whole digestive activity is side-tracked during these emotions, and the blood is driven from the digestive organs to the heart, brain, and muscles. Thus, once more, a condition of bodily readiness is produced suitable to the muscular exertions to which the angry or frightened animal or man is impelled.

[1] For a condensed and readable account of these and other studies by Cannon, see his *Bodily Changes in Pain, Hunger, Fear and Rage*, New York, 1915.

The bodily preparation for flight or fighting goes much further than this. Not only is the digestive activity checked, but the heart beats rapidly, the blood pressure rises, and the breathing becomes deeper and more rapid—all suitable preparations for a period of intense muscular activity. Sweat may break out on the skin and thus make an early start towards the elimination of heat from the body that must occur with muscular activity. All of these bodily changes, it is interesting to note, result through the action on the organs of the sympathetic system of nerves, which, though not under voluntary control, is thus shown to be aroused by the brain. But the most curious set of facts recently added by the physiologists to our knowledge of emotional states concerns the participation of two small glands that are adjuncts of the sympathetic system—the adrenal glands, so named from their location near to the kidneys, though they are not directly related to the latter organs in function. They are glands producing an 'internal secretion', that is to say, a fluid discharged into the blood stream, and by it carried to all the organs of the body, many of which it takes effect upon, the effect varying with the organ. The heart it stimulates to greater activity, the blood vessels of the internal organs it causes to constrict, the movements of the stomach and intestines it stops, the liver it excites to pour out into the blood its stores of sugar, that best fuel for rapid combustion by the muscles, the muscles, in some obscure but efficient way, it preserves from fatigue, and finally the blood itself it puts in such a condition that it will clot rapidly in any wound that may chance to occur. Now Cannon has demonstrated

by a whole cycle of experiments that the adrenal glands are excited during pain, fear, and rage to pour out their secretion into the blood, and to produce the changes just listed; and by this means, as well as by the direct action of the sympathetic nerves, the body is brought into a condition of eminent preparedness for the activities of flight, self-defense, or aggression.

The significance of these discoveries for the psychology of the emotions is evidently very great. The bodily changes that accompany emotion are now seen to be much more than merely incidental. At least in the cases of fear and anger, they are of extreme importance as a preparation for the overt action which is likely to follow; and the same can be said of the pleasurable state of appetite for food. Whether the conscious emotion consists entirely of sensations of these internal changes, cannot be said; but it is quite likely to be that in part, since organic sensations must result from the internal changes described. Cannon mentions the feeling of great strength that attends the bodily state of readiness for great exertion; and it is not unlikely that this feeling is a complex of organic sensations. In part, then, it is rather probable that an emotion is the way the body feels when it is prepared for a certain reaction.

The emotion is also impulsive; it is an impulsion towards the particular reaction that the body is prepared for. Fear is an impulse to escape, and at the same time, organically, a readiness for the exertion of escape; and anger is an impulse to do damage, and at the same time a bodily readiness for the exertion of fighting. Appetite is an impulse to eat and at the same time a bodily readiness for the reception of food. Much the

same can be said of certain other emotions, if not of all. The emotion with its bodily state is a sort of preparatory reaction looking towards the consummatory reaction at which the whole process is aimed. A dangerous object arouses the impulse to flee, a drive towards the consummation of escape, while at the same time it arouses the sympathetic nerves and adrenal glands, and through them checks digestion, hastens the heart-beat, and increases the supply of fuel available for muscular activity.

Whether these newer discoveries and conceptions are favorable to the James-Lange theory of the emotions is not perfectly clear. Cannon calls attention to the fact that the bodily changes in fear and anger are the same, though the emotions are different, and infers that the emotion cannot be wholly a reflection of the bodily state. The bodily state which he has discovered might, indeed, be better correlated with the more generic conscious state of *excitement*, which Wundt has put forward as one of the elementary feelings. Probably this bodily state occurs when the emotion is not strictly either fear or anger. Cannon finds evidence of it in athletes before and during a contest, and in students during an examination, though the conscious state in these cases is probably not exactly either fear or rage; it would better be named zeal, determination, or excitement. Yet it is not at all improbable that minor differences in the bodily condition exist corresponding to these differences in the emotional state, so that the body is not quite the same in fear as in anger; and consequently the James-Lange theory is not to be altogether discarded as yet.

What the theory certainly seems to lack is a sufficient emphasis on the impulsive aspect of the emotion, its

tendency towards some consummation. James said, more or less, no doubt, in a spirit of playful paradox, "We are angry because we strike," so including the consummatory reaction of striking along with the preparatory bodily changes as contributory to the complex of sensations that constituted the emotion. As a matter of fact, the striking deserves separate consideration, for the impulse to strike or otherwise damage our antagonist is the most important part of the whole complex. It represents the orientation of the whole organism. Recognition of this fact is not absent from James's treatment, but it remained for McDougall[1] to give it the emphasis it deserved. An emotion, he says, is part and parcel of an instinct. The instinct has a cognitive or perceptive, an emotional, and a conative or impulsive aspect, the last leading over into motor action. In the case of fear, the cognitive aspect is the perception of danger, the emotion is the inner state of fear, and the conative aspect is the impulse to escape, leading to the actual movements of escape. Instead of treating the second aspect as purely subjective, we may now utilize the results of Cannon and conceive of the emotion as representative of the bodily state of preparedness. Danger arouses a 'set' of the nervous system towards escape and at the same time, through the sympathetic division, an organic readiness for the exertion of escaping.

The admission ought certainly to be made that we have little knowledge of the bodily conditions attending emotions (or attended by emotions), except in a few instances: fear, rage, hunger, and lust. In these in-

[1] In his *Introduction to Social Psychology.*

stances the set towards a consummatory reaction and the concomitant organic preparedness are clearly present, and the emotion, as a subjective state, may reasonably be regarded as representative of this set and this preparedness. There are a number of other bodily conditions of which the same sort of thing can be said: thirst, suffocation, discomfort from cold or from heat, drowsiness, fatigue. In each case there is a drive towards a consummatory reaction—drinking, getting air, warmth, coolness, sleep or rest—and in each case there are internal bodily changes in the direction of preparing for this reaction, or of accomplishing in some measure the same end-result. Also it can be said that the subjective states accompanying these bodily conditions have a considerable analogy with emotion, even though they are not usually classed with the emotions. From the standpoint of the James-Lange theory they can perfectly well be regarded as emotions. The impulse to general activity, which we see especially in children, but which is characteristic generally of joyful states of mind, probably goes with a bodily state of freshness and surplus energy, the subjective side of which may be the feeling of wellbeing, 'euphoria'.

When we consider mirth or amusement, we have no difficulty in identifying the impulse involved, which is simply the impulse to smile and laugh—though the ultimate biological utility of these peculiar reactions is not clear. There are also internal changes, especially circulatory, that we know to accompany the subjective state of mirth, and nothing is more probable than that there are other internal changes belonging with this state but not yet discovered; so that the mutual rela-

tions of subjective state, internal bodily condition, and overt activity are the same here as in case of fear and rage. Grief, in its primitive form, such as we see in young children, is an impulse to weep, again with internal bodily changes. The biological significance of the reaction is here pretty clear—the crying attracts the attention of the mother. It is a reaction of helplessness, not directly accomplishing anything, but serving to bring another to the aid of the distressed individual. Not that the infant has this useful end in view at the first; for here, as with the sex and hunger instincts, the ultimate end of the act is not presented to the individual by instinct. His impulse is directed towards an immediate end, the biological utility of which he does not see. Grief remains typically a passive emotion, as distinguished from fear and anger, where the individual himself accomplishes something. Grief is typically the state of mind appropriate to a condition of affairs where nothing is to be done, and least by the grieving individual. The correlative state of mind in one who can succor the grieving person has been named the 'tender emotion', and is best seen in the mother with her baby. The impulse is to feed, protect, or fondle the child; and it is not at all unlikely that internal bodily changes analogous to those in fear and anger, though different of course, occur here also.

All in all, it appears as if the formula developed from our rather precise knowledge of fear and anger were probably applicable also to a number of other emotions, and possibly to all; so that it is a reasonable theory that the emotion, as a conscious state, represents or is correlative with (1) the drive towards a certain consum-

matory reaction, and (2) the bodily state of preparedness for that reaction. It is clear also that native equipment provides for the internal preparation as well as for the overt reaction.

Besides sensations, emotions, and reactions, native equipment also includes aptitudes or 'gifts' for certain activities, or for dealing with certain classes of things. We recognize this type of native aptitude when we speak of one person as having a natural gift for music, another for mathematics, another for mechanics, another for salesmanship. No doubt many such aptitudes are complex and demand analysis at the hands of the psychologist; but it is equally true that there is something specific about many of them, such that an individual who is gifted in one direction is not necessarily gifted in another. It is not, then, simply a question of native differences in general ability—though the existence of mentally defective individuals seems to show that there are native differences in general ability —but it is largely a question of native aptitudes of a specific sort. We observe such aptitudes 'running in families', and 'cropping out' in individual members of gifted families separated by a generation or more from other members who have manifested the same gifts. We find resemblances between members of a family in ability to perform tests of an unusual sort, but calling for specific abilities; and, all in all, we cannot escape the conclusion that aptitudes are hereditary and form part of the native equipment. They are often designated as 'native capacities'.

That there are native capacities appears not only on comparing one individual with another, or one family

with another, but by comparing the human species with animals. Language is characteristically human, while finding the way home is apparently a stronger aptitude in birds, especially. Counting and dealing with number relations are certainly human, as is the power of using objects as tools.

Native capacities differ from instincts in that they do not provide ready-made reactions to stimuli. We do not expect the musically gifted child to break out in song at some special stimulus, and thus reveal his musical gift. We expect him to show an interest in music, to learn it readily, remember it well, and perhaps show some originality in the way of making up pieces for himself. His native gift amounts to a specific interest and an ability to learn specific things. The gifted individual is not one who can do certain things without learning, but one who can learn those things very readily.

There would be little profit in attempting an inventory of this side of native equipment. We should simply have to enumerate the various occupations of mankind, and the various classes of objects in which he finds an interest, and in dealing with which he shows facility. Undoubtedly, a psychological analysis of human activities would be possible, but thus far it has made so little progress that we may pass it by. The analysis of mental performances which is traditional proceeds according to the abstract form of the performance rather than according to the subject dealt with—according to the 'faculties' of perception, memory, reasoning, imagination, etc. Apparently men differ not so much in respect to their native ability to perceive,

remember, or reason as in the class of subject-matter in which they excel. Certainly the striking instances of great ability are instances of ability in some special field of things to be dealt with rather than in some special faculty. One individual is born with a special adaptability to certain aspects of the world, and another with a special adaptability to other aspects.

Native equipment may be conceived as consisting of mechanisms either fully formed, as in the case of breathing, or growing of themselves to full functional condition, as in the case of those instincts that mature after birth, or requiring experience to develop them to a functional condition and taking their precise form from the peculiarities of the individual experience, as in the case of capacities. Some of these mechanisms are so simple and smooth in their operation that they always respond instantly to the proper stimulus without interfering with the action of other mechanisms, while some of them cannot, when aroused to action, reach their goal at once, but remain active and furnish the drive for other mechanisms. In other words, the mechanism tending towards a consummatory reaction, on being itself aroused, furnishes the drive for the mechanisms of preparatory reactions. In this way, native equipment provides drives as well as mechanisms—though every drive is itself a mechanism.

Those native mechanisms that act as drives are of special importance, since they are the prime movers, or ultimate springs of action, in the lives of men or animals. The motives of the adult are derived by a continuous genetic process from the motive forces inherent in his nature. The process of development of derived

or acquired motives is part of the learning process in general, and will receive attention later. For the moment, attention is invited to the question of enumeration of the prime movers of human action.

This is the chief problem attacked by McDougall in his *Social Psychology*. He says, in the introduction to that book:

"The department of psychology that is of primary importance for the social sciences is that which deals with the springs of human action, the impulses and motives that sustain mental and bodily activity and regulate conduct; and this, of all the departments of psychology, is the one that has remained in the most backward state, in which the greatest obscurity, vagueness, and confusion still reign. . . . It is the mental forces, the sources of energy, which set the ends and sustain the course of all human activity—of which forces the intellectual processes are but the servants, instruments, or means—that must be clearly defined, and whose history in the race and in the individual must be made clear, before the social sciences can build on a firm psychological foundation." [1]

Other quotations from the book which reveal its guiding idea follow.

"The human mind has certain innate or inherited tendencies which are the essential springs or motive powers of all thought and action, whether individual or collective, and are the bases from which the character and will of individuals and of nations are gradually developed under the guidance of the intellectual faculties" (p. 19).

[1] Eighth edition, 1914, pp. 2–3.

"Are, then, these instinctive impulses the only motive powers of the human mind to thought and action? . . . In answer to this question, it must be said that in the developed human mind there are springs of action of another class, namely, acquired habits of thought and action. An acquired mode of activity becomes by repetition habitual, and the more frequently it is repeated the more powerful becomes the habit as a source of impulse or motive power. Few habits can equal in this respect the principal instincts; and habits are in a sense derived from, and secondary to, instincts; for, in the absence of instincts, no thought and no action could ever be achieved or repeated, and so no habits of thought or action could be formed. Habits are formed only in the service of the instincts.

"We may say, then, that directly or indirectly the instincts are the prime movers of all human activity; by the conative or impulsive force of some instinct (or of some habit derived from an instinct), every train of thought, however cold and passionless it may seem, is borne along towards its end, and every bodily activity is initiated and sustained. The instinctive impulses determine the ends of all activities and supply the driving power by which all mental activities are sustained; and all the complex intellectual apparatus of the most highly developed mind is but a means towards these ends, is but the instrument by which these impulses seek their satisfactions, while pleasure and pain do but serve to guide them in their choice of means.

"Take away these instinctive dispositions with their powerful impulses, and the organism would become incapable of activity of any kind; it would lie inert and

motionless like a wonderful clockwork whose mainspring had been removed or a steam-engine whose fires had been drawn" (pp. 42–44).

Now if McDougall meant by 'instinct' any native tendency to reaction, one would certainly have to agree with him entirely; for in the absence of some such tendency provided by nature, no stimulus would arouse a reaction, the organism would remain inactive and consequently would have no means of learning or acquiring reactions. But the insistence on 'powerful impulses' gives us pause, since it seems to mean that in the absence of powerful impulses no activity would occur. This would imply a high degree of natural inertia in the organism; and, in fact, McDougall seems to mean this, as also do the psychopathologists who have of late devoted great attention to this matter of springs of action, and whose conclusions we shall consider on a later occasion. But this assumption of great inertia or inertness in the organism, though it might perhaps have a semblance of truth as applied to adults, is rather grotesque when applied to children—and it is to children above all that it must be applied, since it is only young children that are limited to native tendencies, older individuals having developed derived impulses, as indicated in one of the quotations above. If anything is characteristic of children, it is that they are easily aroused to activity. Watching a well-fed and well-rested baby, as it lies kicking and throwing its arms about, cooing, looking here and there, and pricking up its ears (figuratively) at every sound, one wonders what is the nature of the 'powerful impulse' that initiates and sustains all this activity. The fact is that the infant is responsive to a

great variety of stimuli, and that he is 'driven' very largely by the stimuli that reach him from outside; though, when he is hungry, we see him driven by an inner 'powerful impulse' through a series of preparatory reactions towards the consummation of feeding. In the play of older children, also, it is difficult to find a strong incentive necessary; almost anything can be made play and then become attractive on its own account. It is true, as a general proposition, that as the individual grows up, his actions are more and more controlled by inner drives rather than by the immediately present stimuli; but even adults are less inert than McDougall seems to assume. Their activity is more easily aroused, and requires less ulterior motive or drive than he supposes.

However, the main question at present is as to what are the 'powerful impulses' or 'instincts', which, according to McDougall, furnish the only motive forces of much consequence for individual and social activity. He is specific on this point; he finds quite a "limited number of primary or simple instinctive tendencies" (p. 45), which are recognizable largely by the fact that each such tendency has a well-defined emotion as an integral part of it. His list is as follows:

Fear with its impulse to flee (or more generally, to escape),
Disgust with its impulse of repulsion,
Curiosity,
Anger with its impulse to fight,
Self-assertion,
Submission,

The parental instinct, with its emotion of tenderness and its impulse to protect, etc.,
The reproductive instinct,
Hunger,
The gregarious instinct,
The collecting or acquisitive instinct,
The instinct of construction.

"A number of minor instincts, such as those that prompt to crawling and walking."

"Some general or non-specific innate tendencies," namely, the tendency to imitate, the tendency to reproduce in ourselves an emotion which we see another expressing, the tendency to receive suggestions (suggestibility), the tendency to play, the tendency to form habits and to prefer the familiar to the unfamiliar.

If this inventory should be criticized on the ground that it omitted some important tendency—if, for example, one should urge that the laughter impulse deserved mention in view of the obvious instinctiveness of the act, in view of the strong attendant emotion of mirth or amusement, and in view of the considerable amount of activity derived from this impulse, McDougall could well answer that undoubtedly his list would require revision in detail, but that such criticism left the main principle untouched. But if we inquire whether McDougall could be induced to include what we have called native capacities in his list of instincts, we readily assure ourselves that he would not. To include them would lie quite outside of his scheme. They belong rather with those intellectual processes which he asserts to be the servants of the instinctive impulses, to be, in short, mechanisms requiring drive, and not by

any means drives themselves. This is the chief point at which the present discussion takes issue with McDougall—indeed, disagreement on this point is the chief element of contention in this whole book. The great aim of the book is, that is to say, to attempt to show that any mechanism—except perhaps some of the most rudimentary that give the simple reflexes—once it is aroused, is capable of furnishing its own drive and also of lending drive to other connected mechanisms.

The question is, whether the mechanisms for the thousand and one things which the human individual has the capacity to do are themselves wholly passive, requiring the drive of these few instincts, or whether each such mechanism can be directly aroused and continue in action without assistance from hunger, sex, self-assertion, curiosity, and the rest. Now, of course, it must be admitted that sometimes the instincts furnish drive for other mechanisms. With respect to activities of the more intellectual sort, drive comes especially from such instincts as those of self-assertion, curiosity, and construction. The child can be spurred on to industry in his studies by appealing to his self-feeling, as by pitting one child against another, or by urging him to show that he is 'man enough' to accomplish a certain task. Similarly, his curiosity or his natural impulse to manipulate and make things can be played upon in the interests of getting him to accomplish some task. This is true, and yet it is also true that such motives are likely not to carry the child very far in a line where he finds nothing intrinsically interesting to himself. For example, a child may be induced by such means to make a start in learning to sing, but, unless he has a natural

musical gift, he drops out soon, and parries the appeal to his self-feeling by deriding singing and those children who excel him. He finds some way of making this exercise appear unworthy of his effort, whereas the musical child, once started by the appeal to his self-feeling, is carried along by zeal for music itself, and puts forth great energy without requiring such extraneous stimuli to be constantly applied.

It is the same way with curiosity as a motive. Undoubtedly, curiosity may be aroused in the child about a great many things that are new to him. All normal children may thus be got to make a start in the study of plants or numbers or words. But one child then evinces an interest in one particular subject matter, and another child not, though he may show interest in another sort of thing. One child will go far in a certain subject with very little prodding, while another child can only be brought forward by constant attention from above. Yet this second child may later prove to have good abilities in some other line, and do much in it of his own initiative. When the matter of special abilities of individuals is subjected to exact study, it is found that specialization of capacity is a real fact. To be sure, a child who shows ability in one line is rather apt to show some ability in any other line that you may select for examination; yet he is almost certain to have his *forte* at some one point, and not to be equally gifted in all directions. The likelihood of finding a child who does well in one thing doing well also in other things might be laid to such general factors as curiosity or self-assertion, as well as to general retentiveness or general temperamental factors; but the specialization of gifts which

also is in evidence cannot be explained by such general factors. This specialization requires us, at the very least, to conclude to the existence of specialized capacities. The only question that could possibly be raised is as to whether these capacities are anything more than mechanisms. It might perhaps be the case that general factors, such as curiosity, furnished all the drive, but that this drive had most result where it found good mechanisms. According to such a view, the industry displayed by a certain child in number work would be derived from curiosity, self-assertion, or other general motives that were aroused, his success being due to his possession of extra good mechanisms for dealing with numbers; while the industry of another child in music would be due to the general motives of self-assertion, constructiveness, etc., and the special direction taken by the resulting activity in this child would be due to good mechanisms for appreciating and performing music. Can any objection be raised to this way of conceiving the matter?

Well, there is one fact still unaccounted for, and that is the *absorption* of the child in the subject-matter for which he has a special gift. This state of absorption, whether in the child or in the adult, is worthy of our attention in connection with the matter of drive; for it certainly appears that the person who is absorbed in his task is being carried along by the interest of that particular task. Absorption means that attention is wholly directed upon the matter in hand, and that it continues so directed. On the face of it, certainly, there is no outside motive carrying the activity along. Where outside motives are necessary, we cannot speak of

absorption; we then see a constant tendency to break away from the matter in hand, and a being brought back to it by the extraneous motive. This is the familiar process of 'voluntary attention'. The individual has to force himself to attend to something, either because it is not itself interesting, or because some other, more interesting object claims the attention and has to be resisted by voluntary effort. We all know this condition of voluntary attention; and we know that it is very different from genuine absorption. Also we know that very little can be accomplished in such a task as reading or study, so long as the attention to it remains voluntary. To accomplish anything in such a task, we must get really *into* the subject, absorbed in it, finding it interesting and being carried along by the interest of it. Often voluntary effort is needed in order to get a task started, to overcome repugnance, inertia, and distracting influences. The extraneous motive brings the horse to the water, but real drinking does not occur except from thirst, that is to say, from a desire for the particular results obtained by the activity in progress. As a general proposition, we may say that the drive that carries forward any activity, when it is running freely and effectively, is inherent in that activity. It is only when an activity is running by its own drive that it can run thus freely and effectively; for as long as it is being driven by some extrinsic motive, it is subject to the distraction of that motive. Thus, though self-assertion, rivalry, etc., are undoubtedly strong motives for arousing activity, nothing worth while is accomplished by the individual who remains self-conscious, and nothing is accomplished, except in the simplest sort

of activities, by the person who keeps the rivalry attitude constantly. We all know this type of behavior, where the interest of the performer is in himself and not in the work. One who has thoroughly prepared for a public performance of some sort, may break down in the performance because of inability to get away from the desire to do his best in the presence of all these spectators, this self-consciousness making impossible a direct application of his energies to the work in hand. The motive that originally induced him to go in for this event may very well have been a desire to distinguish himself; but this motive has to drop out of sight or else by its distraction spoil the performance. It is not true, then, that the motive that initiates a given activity furnishes the motive force for the whole activity; it simply leads the performer up to the act, but the motive force for the act itself must be inherent. In short, you simply must take as your immediate aim the accomplishment of the particular act before you. If you are to accomplish a given result, you must aim at that result, and, for the moment, must get interested in that result for its own sake. You will never get anywhere in the particular activity by virtue of your general tendencies. This is notably true of continued and complex systems of activity, such as most human activities become. Unless you get up an interest in a system of activities you can accomplish nothing in it. Extraneous motives may bring you to the door of a system of activities, but, once inside, you must drop everything extraneous.

McDougall's principle, therefore, "that the original impulse or conation supplies the motive power to all

the activities that are but means to the attainment of the desired end," would make a very bad guide in education or in any attempt to control and influence the behavior of men. It would lead the teacher to introduce extraneous motives at every turn and leave out of account the interest which might be generated in the subject matter. It would lead the manager of a business to conclude, since the employes are certainly there for the prime purpose of earning money, that it would be hopeless to generate in them any loyalty and enthusiasm for the concern or any interest in the technique of its processes. This principle would also make a very bad guide in understanding the motives of men; for, according to it, we simply have to discover the motive that led the individual originally to such and such a line of activity, and then we know the motive for his every act within that line. He, for example, chooses teaching as his livelihood, and therefore each of his acts is driven by the economic motive; his apparent interest in his pupils and in his subject are illusions. McDougall seems to recognize the inadequacy of his guiding principle in one or two passages, as when he says (p. 349) that an act, originally undertaken simply as a means to some further end, becomes to the individual an end in itself. "Nothing is commoner than that the earning of money, at first undertaken purely as a means to an end, becomes an end in itself." This is certainly true, and it is still truer that an accountant becomes interested in his accounting, the designer in his designing, and every one who has a decent job in the work of his job without constant regard to the pay envelope. McDougall would perhaps reply that he has sufficiently allowed for all this

sort of thing in recognizing the importance of habit as a driving force—the accountant has become habituated to his accounting, and momentum keeps him going in that line. This, however, does not explain the *learning* of a trade or profession. It cannot be learned without getting interested in it directly and on its own account. So, in the process of learning typewriting, it has been found that progress beyond a certain low level does not come automatically, nor by virtue simply of great voluntary effort, but only by getting completely absorbed in the work of typewriting itself. What a dull world, after all, it would be if things had no interest in themselves, but only as they appealed to some one of the primary instincts or a derivative from them!—if, with all our human capacities for dealing with things, we remained, as regards interest, at the level of the animals, with perhaps a more mobile curiosity, a greater tendency to manipulation and construction, and a stronger dose of self-assertiveness! It would certainly be unbearable to spend so much of our time in multifarious labors with things that offered no attraction of their own, but were dealt with simply as means to a few remote ends. A man's whole working day would be occupied with uninteresting things. To be sure, modern division of labor in some of the lines of manufacture has gone far to reduce the labor of the individual worker to so bare a routine that he can scarcely take an interest in it; but this is recognized as a defect in the present industrial system. According to McDougall's principle, it would be no defect, since it does not in the least do away with the economic motive that leads men originally into industry. Human life would certainly be bare

and dull if, along with the vast human capacity in the way of mechanisms for acting, there were no corresponding increase in interests. The result of such a disproportion would be that we should only seldom be working for an end that directly attracted us; almost all of our activity would be of the nature of drudgery, requiring outside drive to keep it going.

As a matter of fact, human interests keep pace with human capacities. Almost always, where a child displays talent, he also displays interest. It might not be amiss to extend McDougall's conception of the connection of instincts and emotions so as to speak of a native interest as the affective side of a native capacity. Along with the capacity for music goes the musical interest; along with the capacity for handling numerical relations goes an interest in numbers; along with the capacity for mechanical devices goes the interest in mechanics; along with the capacity for language goes the interest in learning to speak; and so on through the list of capacities, both those that are generally present in all men and those that are strong only in the exceptional individual. From the introspective side, an interest is somewhat similar to an emotion; from the side of behavior, it is a drive towards activity of the capacity to which it is attached.

The instincts are adaptations to very general features of the environment, while the capacities are adaptations to more special features. Curiosity, for example, is a native adaptation to an environment that changes and continually presents something new; its behavior consists in the exploration of what is new. The capacity for perceiving number relations is an adaptation to a more

special feature of the environment; its behavior consists in counting, adding, subtracting, and performing more complicated arithmetical operations. This number behavior is scarcely present in animals; it represents a specialized adaptation that is characteristically human. Now there is no obvious reason in the nature of things why the more general adaptations should have the character of drives while the more specialized adaptations should exist simply as passive mechanisms. There is no obvious reason why this should be so, and there is no evidence that it is so, the evidence from the specialized activities of men and from their power to become absorbed in these activities being quite to the contrary. We are justified, therefore, in concluding that the native capacities are essentially in the same position as the instincts as regards this matter of drive. The native capacities are mechanisms that are, in the first place, readily aroused to activity, and that therefore require little stimulus to start them going; and in the second place, once they are aroused, they, like the instincts, tend to remain active and to act as driving forces also for other related mechanisms that at the moment are not otherwise activated.

The system of native human motives is thus much broader and more adequate to the specialization of human behavior than McDougall's conception would allow. It is especially the *objective* interests that are thus provided for—the interest in color, form, tone, number, spatial arrangement, mechanical effect, plants and animals and human beings. It is not so much the intellectual activities in the abstract—reasoning, imagination, memory, and the rest—that interest us,

as the different classes of object that appeal to our natural capacities. The world is interesting, not simply because it affords us food and shelter and stimuli for all our primal instincts, but because we contain within ourselves adaptations to many of its objective characteristics and are easily aroused to interesting and satisfying activity in dealing with these characteristics. The field of human motives is as broad as the world that man can deal with and understand.

IV

ACQUIRED OR LEARNED EQUIPMENT

Extensive as is the native equipment of man, with its manifold sensations and emotions, movements and interests, it would bulk rather small, numerically, in an inventory of the whole equipment of the adult. Seldom, except in the internal workings of the body, does one perform a purely instinctive act. Previous learning has usually come in and given modified forms of behavior. We act as we have learned to act, see what we have learned to see, are interested in what we have learned to be interested in, enjoy what we have learned to enjoy, and dislike what or whom we have learned to dislike. Yet it would be a great mistake to suppose that the adult had 'scrapped' his native equipment—except in relation to digestion and similar internal processes—and built up for himself an entirely new outfit, by means of which he carried on his rational adult activities. The native equipment, or much of it, remains in use and is built up into the more complex and specialized mechanisms of learned activity.

Laughing—to take a clear case—is a movement that does not have to be learned. Though the child does not laugh for several months after birth, he comes naturally to laugh, when he has developed to a certain point. First he begins to smile, and a little later surprises and delights his mother by laughing aloud. He does this before he shows any signs of imitating the actions of

others, and evidently does not learn to laugh, but comes to it naturally. Throughout life, laughing is involuntary, and few persons are able to get a real laugh except when they are genuinely amused. Thus the motor side of laughter is provided by native equipment, and remains an instinctive act, aside from certain refinements that may be introduced, and a certain moderation or complete suppression that may be imposed by propriety.

But when we ask what it is that arouses laughter, we see at once that this side of the matter is not wholly provided by nature. The situation that provokes mirth in the adult has no power to do so in the child, while the situations that make the young child laugh lose the power to do so as the child grows up. And one man laughs heartily at a joke that has no such effect on another. What causes great hilarity in one social group may be tame, or trite, or shocking, or simply baffling, in other circles. Each nation develops to some degree a set of laughter-stimuli peculiar to it, and, finding other nations unresponsive to its own particular form of wit, judges them to be lacking in a sense of humor. The English speak of 'easy jokes for Scotch readers'; the Americans maintain that the Englishman cannot see a joke; and the German, in Mark Twain's story, complained that the choice specimen of American wit that was offered him was 'no joke but a lie'. Exaggerations or puns are not appreciated without training; they did not have the power originally of evoking laughter, but have gained this power, with many people, through the effect of experience. The motor act of laughing, then, is provided by native equipment, but

its attachments to the stimuli that provoke it in adults have been acquired.

Amusing situations are of such variety that it is difficult to find anything common to them all which could be assigned as the essential mirth-arousing factor. Attempts to find such a common factor are however in existence under the name of theories of humor. One of the most noteworthy of these was early formulated by Hobbes (*Leviathan*, Chapter VI) in the following terms:

" 'Sudden glory' "—by which he means sudden self-glorification—"is the passion which maketh those 'grimaces' called 'laughter'; and is caused either by some sudden act of their own, that pleaseth them; or by the apprehension of some deformed thing in another, by comparison whereof they suddenly applaud themselves. And it is incident most to them, that are conscious of the fewest abilities in themselves; who are forced to keep themselves in their own favor, by observing the imperfections of other men."

Evidently, Hobbes is rather cynical in regard to laughter; and his theory is typical of most theories of humor, in that they seem like the work of individuals who are not themselves addicted to humor. They give the impression of being the attempts of those who cannot see the joke to explain what other people are laughing at. Still it must be admitted that the element of suddenness, insisted on by Hobbes, is generally essential in a mirth-provoker; and the other element in his conception, the sense of superiority to others, can actually be found in a surprisingly large proportion of specimens of wit and humor. The practical joke, about the most effective stimulus to laughter with the untutored man,

puts some one in a position of temporary inferiority, and is not usually appreciated by the victim; and many jokes of a more intellectual sort also have an analogous element of maliciousness. On the other side, we have the fact that inferiority in another person may awaken pity or disgust, instead of laughter. Similar exceptions can be found to the other theories that have been put forward, as for example that which holds the mirth-producer to be an incongruity between two elements in a situation, or between expectation and realization.

The great objection, however, to all existing theories of humor is that they are not genetic, or, at least, not based on knowledge of the genesis of the sense of humor in the individual. We ought, first of all, to discover what is the stimulus that naturally arouses smiling and laughing in the infant—it can scarcely be a sense of his own superiority—and to trace out the succession of stimuli that get the power to amuse him as he grows older. Perhaps a common element could thus be discovered in all the stimuli and shown to be the essential element; though this is by no means certain, since the association of a given type of situation with amusement might depend on accidents of the individual's history rather than on any inherent likeness between this situation and the natural stimulus to laughter. We do not know the natural history of laughter well enough as yet to give a satisfactory theory. But so much as this is pretty certain, that, while we laugh by nature, we learn what to laugh at.

The same can be asserted of grief, fear, or anger. The motor side of each is provided by native equipment, but the stimuli that evoke these reactions change

with experience, and their connections with the reactions are learned or acquired by the individual. This is generally true of emotions and their appropriate acts.

The attachment of a natural reaction to a stimulus that is not its natural stimulus can be observed in much simpler cases than these of the complex emotions. Many instances can be observed in animals, such as the following from Spaulding.[1] A hermit crab was kept in an oblong aquarium, one end of which could be darkened, leaving the other end light. The crab instinctively kept out of the dark end, but would go there when food was placed there, being attracted by effluvia of the food substance coming through the water. After being repeatedly fed in this way, the crab would go to the darkened portion of the aquarium, even when no food was placed there. Thus the food-seeking reaction had become attached to the darkening as a stimulus. The experiment was carried further by placing a wire screen, with a hole through it, between the crab and the food. The crab not only learned the way through the screen, but after awhile reacted to the screen as a stimulus, going behind it as soon as it was placed in position, even without the presence of food. The screen, not itself an original arouser of the food-seeking reaction, came by 'association', as the phrase runs, to have the power of arousing it.

In the same way, the sight of food, though having no original power to excite the flow of saliva, comes from frequent association with the taste of food, which has this power, to have the power itself. Even the name of a food may produce the same result. Evidently there is

[1] *Journ. of Comp. Neurol. and Psychol.*, 1904, XIV, 49.

no inherent likeness between the sound of the word 'beefsteak' and the taste of beefsteak; and this case illustrates in a different field what was said a moment ago, to the effect that the various mirth-producers (like the various saliva-exciters) need not have more than an accidental or historical community.

The case of the flow of saliva has been worked out with experimental precision by the Russian physiologist Pawlow. A substance which naturally arouses this reflex was introduced into a dog's mouth, and simultaneously a bell was rung. After this had been repeated a number of times, the bell, without the tasting substance, gave the reaction. Pawlow called a reflex thus aroused by some other than its natural stimulus a 'conditioned reflex'. Other reflexes can be similarly 'conditioned', or associated to stimuli that have no power to evoke them apart from their having occurred concomitantly with the natural stimulus. Such secondary or artificial connections may be only temporary, or may become permanent in the individual. Many fears, aversions, likes and dislikes are undoubtedly conditioned reflexes, and this type of learning accounts for a large proportion of our acquired equipment. It enables us to utilize our native stock of movements in accordance with the special conditions in which we grow up. It does not account for the addition of learned actions to the native stock, but for the linking of natural actions to new stimuli.

In view of the importance that the very modern conception of the conditioned reflex is taking in discussions of learning, it is interesting to recall that Locke, in his chapter, 'Of the Association of Ideas', has in mind very much the same sort of thing. He does not employ 'association' so widely as his successors in the associationist school, but uses it

especially to explain irrational connections of ideas. He says (*Essay Concerning Human Understanding*, Book II, Chapter 33):

"Some of our ideas have a natural correspondence and connexion one with another; it is the office and excellency of our reason to trace these, and hold them together in that union and correspondence which is founded on their peculiar beings. Besides this, there is another connexion of ideas wholly owing to chance or custom: ideas, that in themselves are not at all of kin, come to be so united in some men's minds, that it is very hard to separate them . . . To this, perhaps, might be justly attributed most of the sympathies and antipathies observable in men, which work as strongly, and produce as regular effects as if they were natural, and are therefore called so, though they at first had no other original but the accidental connexion of two ideas, which either the strength of the impression, or future indulgence so united, that they always afterward kept company in that man's mind, as if they were but one idea. I say most of the antipathies, I do not say all, for some of them are truly natural, depend upon our original constitution, and are born with us; but a great part of those, which are counted natural, would have been known to be from unheeded, though, perhaps, early impressions, or wanton fancies at first, which would have been acknowledged the original of them, if they had been warily observed. A grown person surfeiting with honey, no sooner hears the name of it, but his fancy immediately carries sickness and qualms to his stomach, and he cannot bear the very idea of it; other ideas of dislike, and sickness, and vomiting, presently accompany it, and he is disturbed, but he knows from whence to date this weakness, and can tell how he got this indisposition. Had this happened to him by an overdose of honey, when a child, all the same effects would have followed, but the cause would have been mistaken, and the antipathy counted natural. . . .

"*Instances.* The ideas of goblins and sprites have really no more to do with darkness than light; yet let but a foolish maid inculcate these often on the mind of a child, and raise them there together, possibly he shall never be able to separate them again so long as he lives; but darkness shall forever afterward bring with it those frightful ideas, and they shall be so joined that he can no more bear the one than the other.

"A man receives a sensible injury from another, thinks on the man and that action over and over; and by ruminating on them strongly, or much in his mind, so cements these two ideas together, that he makes them almost one; never thinks on the man, but the pain and displeasure he suffered come into his mind with it, so that he scarce distinguishes them, but has as much an aversion for the one as the other. Thus

hatreds are often begotten from slight and almost innocent occasions, and quarrels propagated and continued in the world.

"A man has suffered pain or sickness in any place; . . . though these have in nature nothing to do one with another, yet when the idea of the place occurs to his mind, it brings (the impression being once made) that of the pain and displeasure with it; he confounds them in his mind, and can as little bear the one as the other. . . .

"Many children imputing the pain they endured at school to their books they were corrected for, so join these ideas together, that a book becomes their aversion. . . . There are rooms convenient enough, that some men cannot study in, and fashions of vessels, which, though ever so clean and commodious, they cannot drink out of, and that by reason of some accidental ideas which are annexed to them, and make them offensive. . . .

"Some such wrong and unnatural combinations of ideas will be found to establish the irreconcilable opposition between different sects of philosophy and religion. . . . This gives sense to jargon, demonstration to absurdities, and consistency to nonsense, and is the foundation of the greatest, I had almost said, of all the errors in the world". . . .

Locke's way of stating his case is rendered somewhat unpalatable to the modern student by his broad and vague use of the term 'idea', and his always speaking of the connection of ideas when we should speak of the connection of stimulus and response; and it is a great advantage to have such connections demonstrated experimentally in very simple forms of behavior, as the recent animal psychologists have done. But when we go on to apply the conception of the conditioned reflex to behavior on higher levels, we are following very closely in Locke's footsteps. His suggestion that many antipathies and fears date back to accidental associations in childhood is specially worthy of attention.

Besides this association of old reactions to new stimuli, there can also be observed, from a very low level of animal behavior up, a dissociation of reactions from their natural stimuli. Even protozoa or one-celled animals show temporary effects of this sort. Let such an animal be disturbed by a sudden current in the water in which it lives—a jet of water squirted at it. It responds by a contraction or some other avoiding reaction. If the stimulus is repeated at short intervals, the reac-

tion diminishes in force and then ceases to occur. The animal has become adapted, 'negatively adapted', to the harmless stimulus. In the case of protozoa, the adaptation is only temporary, since, after a rest, the response will occur again as at first. There has been no addition to the native equipment, nor subtraction from it. In higher forms of animals, the adaptation may hold over a period of rest. A spider, observed by the Peckhams,[1] dropped from its web—a defensive reaction—at the sound of a large tuning fork. When it had climbed back, the stimulus, repeated, gave the same response; and so on for about half-a-dozen times, after which further repetition of the stimulus did not elicit the response. The next day, response again, ceasing as before after a few repetitions. But after fifteen days of the same sort of training, the response could no longer be got from the sound of the tuning fork. The adaptation to the stimulus had become fixed, and constituted an addition to the native equipment of the spider—a negative addition, in a way, yet one that was of positive advantage to the animal in the direction of economy.

Many other instances could be cited in which a stimulus that naturally gives a certain response ceases to have the power to do so. The defensive or avoiding reactions are naturally made in response to stimuli that are under certain circumstances harmless; but if the stimulus frequently recurs under these circumstances, it may become disconnected from the reaction, at least under the given circumstances, as occurs when a horse gets used to a harness or to being handled. The fighting reactions may similarly become dissociated from some of their

[1] *Journ. of Morphol.*, 1887, I, 383.

natural stimuli, as in the case of dogs and cats that learn to live together peaceably. Disjunction may also occur between the food-getting reactions and some of the stimuli that naturally arouse them.

But the commonest case of such disjunction is that between the exploring and attending reactions and many stimuli that at first arouse them. By nature, any sensory impression that is at all strong or sudden attracts attention; but it loses this power with frequent repetition, unless, on being attended to, it has led to some further reaction. We thus become negatively adapted to the ticking of the clock, to the presence of any object that does not call for action on our part, to the beauty of an always-present landscape or picture, to the amiable qualities of our husbands and wives, and to any demands on our attention and effort that can be disregarded with impunity.

Negative adaptation is a source of economy of effort, and gives evidence of the working of a principle of economy in living things. There is another type of disjunction between a natural reaction and a stimulus that naturally arouses it, a disjunction brought about by the unfavorable outcome of the reaction when made in response to this particular stimulus. The young chick picks up a caterpillar as it does any other object of similar size, but promptly drops it, and after a few such experiences, ceases to peck at caterpillars. Triplett's interesting experiment [1] on the perch and the minnows deserves mention here. Two perch were kept in an oblong aquarium, one end of which was shut off by a glass partition. They had formerly been fed on

[1] *Amer. Journ. of Psychol.*, 1901, XII, 354.

minnows, but at the time of the experiment in question their food was changed to fishworms. Minnows were placed from time to time, and later left all the time, in the further part of the aquarium. The first reaction of the perch to the presence of the minnows was to dart at them, but after bumping their noses many times against the glass partition, they gave it up for the day, and on the next day, when the minnows were again put in, made less effort to get them than on the first day. At the end of a month of such training, the perch having ceased to strike the glass, the partition was removed, but the perch behaved as if it were still there, swimming up to the line where it had been, and along that line, but not crossing it. The minnows, however, swam over to the perch, but were perfectly safe. The perch had ceased to hunt minnows, at least in that aquarium.

A similar experiment on mammals may also be described.[1] A mouse is placed in a small box, with two passages leading out of it. The mouse reacts, sooner or later, by entering and exploring one of the passages. As he does so, he steps on some wires in the floor and receives an electric shock strong enough to be unpleasant but not injurious. He retreats from the passage, and does not immediately re-enter; in fact, he tends to remain for some time in the box and not to explore further. After a time, he becomes uneasy and starts to explore again. If he enters the same passage as before, he again gets a shock, but if he goes to the other passage, he gets no shock, but escapes from the narrow confinement of the box to his nest. The experiment being repeated a number of times, the mouse comes to take

[1] See Yerkes, *The Dancing Mouse*, 1907, pp. 95 *ff.*

always the passage that gives no shock. This may be the right-hand or the left-hand passage, in which case the discrimination is quickly established; in fact, one experience of the shock is often sufficient when the choice offered is simply between right and left. When one passage is fronted with a white arch and the other with a black arch, these signs being frequently interchanged, and a shock given whenever, let us say, the passage with the white sign is entered, it takes the mouse perhaps a hundred trials before he avoids the white altogether; and if the signs are two shades of gray, not very different from each other, a still larger number of trials is required before the discrimination is fully established. What the experiment shows for our present purpose is, first, that a stimulus which naturally arouses a positive reaction—in this case, exploration—becomes disjoined from this reaction and joined to a negative or avoiding reaction, as the result of a painful stimulus accompanying the positive reaction; and, second, that, driven by the need of escaping from confinement and by the need of avoiding the pain, the animal comes to attend to certain features of the situation—here the black, white, or gray signs—that he naturally pays little attention to. The avoidance of the pain-giving passage can be understood as a case of conditioned reflex: the sight of the passage is quickly followed by the shock which calls out the avoiding reaction, and thus the sight of the passage comes itself to evoke the avoiding reaction, while the exploring reaction, incompatible with the avoiding reaction, is shunted out. Attention and reaction to features that would otherwise have been neglected may perhaps be understood as follows: driven

by the need of escaping from the box, the mouse is brought to a halt by the painful stimulus, and thus stimuli which have only a faint power to arouse response in him have a chance to exert whatever power they have.

Disjunction of a response from its natural stimulus by punishment, like the other form of disjunction by adaptation, plays a great part in modifying human as well as animal equipment for future action. To be effective, punishment should be applied in direct connection with the act punished, it should be applied regularly and not spasmodically, and it should be just severe enough to produce the avoiding reaction, without causing such fear as to paralyze further attention to the situation. A situation which elicits a punishable reaction may be well conceived of as a puzzle, the solution of which depends upon attention to elements that have no great power to attract the attention of the animal or natural man; but if the element in the situation that does naturally control the response brings punishment without paralyzing activity, other elements may be observed and a suitable reaction reached.

Punishment need not mean pain. If a man or animal has a 'dead set' towards a certain result (or 'consummation'), being foiled in the pursuit of this aim is, subjectively, as unpleasant as actual pain, and acts as an effective punishment, deterring not, indeed, from the pursuit of the end, but from the means which have led to ill success. A rat—to recur to the animal experiments[1] —is placed in a maze with food at the center. At first, being unaware of the neighborhood of food, the rat simply explores; but after it has once come upon the

[1] See Hicks and Carr, *Journal of Animal Behavior*, 1912, II, 98.

food, and is then replaced at the beginning, its behavior shows an urgency that indicates searching. After a number of trials, it avoids all the blind alleys, and races at top speed through the maze to the food. Its behavior towards the blind alleys is interesting. At first, any passage arouses the exploring reaction, but when in search of the food, it comes out of a blind alley as soon as it has explored it a little; the next time, it may simply stick its head in and pass on; while finally it disregards the blind alley altogether. In short, it develops a negative or avoiding reaction to the blind alley very much as if an electric shock were concealed there.

A somewhat different form of experiment, much used in studying animal learning, is the 'puzzle-box', a cage to be escaped from by operating some mechanical device, such as a bolt. A cat, in Thorndike's experiments,[1] was placed hungry in the cage, and a bit of food outside, visible through the bars of the cage. The animal tries to squeeze between the bars toward the food. Foiled here, it attacks some other promising opening, or some part of the cage that stands out enough to attract its attention. It bites here, claws there, pulls and shakes anything that moves or yields at all, and among other things attacks the bolt and eventually gets out and is rewarded by food. Replaced in the cage, it does much the same, but is apt, on the whole, to make fewer useless movements and escape more quickly. In the course of a number of trials, more or fewer according to the difficulty of the act required, it eliminates all the unsuccessful reactions, and becomes able to escape instantly. This has been called learning by 'trial and

[1] *Animal Intelligence*, 1898.

error'. The outstanding features of the process are (1) the set or drive to get out, (2) the varied reactions made to various features of the complex situation that confronts the cat, (3) the gradual elimination of the unsuccessful reactions, and (4) the directness and speed with which the successful reaction is finally made.

The inner nature of this process of learning by trial and error is not yet clear. Thorndike has based upon it his 'law of effect', which states that the satisfying or unsatisfying outcome of a reaction acts respectively to strengthen or weaken the connection between the stimulus and that reaction, so that those reactions which bring satisfaction gradually get the advantage over those that do not. Watson and others have sought to get rid of this law of effect, and explain everything in terms of the conditioned reflex and of the long-accepted 'law of frequency', which states that the connection between a stimulus and a response is stronger in proportion to the number of times the reaction has been made; but their analysis is as yet far from complete. There can be no manner of doubt that an unsuccessful reaction acts as a punishment and leads to avoidance of that particular act; and it is also highly probable that that one of the preparatory reactions which leads over directly into the consummatory reaction gets the benefit of the dammed-up energy tending towards the consummatory reaction, and so becomes integrated with the consummatory reaction into a single complex act. If this is a correct interpretation, we have in this instance of learning something that we have missed hitherto, namely, the addition, not only of new connections between stimulus and native response, but the building up of two natural

responses into a single complex act. The cat does not simply eliminate unsuccessful reactions to the situation, and thus leave the successful response as the sole reaction, but it learns the complex response of pushing-the-bolt-going-out-and-eating.

In the human being, acquired equipment contains a vast number of complex acts that have been integrated in the process of learning and so made available as units. Language furnishes a host of instances. The elementary movements of vocalization and articulation are provided by nature and executed by the infant before he begins to learn to speak. His learning to speak consists partly in forming fixed compounds of these elementary movements—such fixed units as words, syllables, and familiar phrases—which thereafter are units for him. The mechanism for a word or familiar phrase is thrown into action by a single act, and not by a series of conscious acts corresponding to the linguistic elements of the word or phrase. The same sort of thing is true of writing. Nature provides the elementary finger movements; training combines these into the complex movements of making loops and letters, writing whole words, signing one's name. After training, these complex movements are thrown into action as units. In learning to read, a child may begin with the letters, or with words, or even with short sentences; but, in any case, he comes finally to respond to the complex printed patterns as units. More precise information as to the method of learning to deal with such linguistic complexes has been obtained by experiments on the learning by adults of typewriting and telegraphy. The process of learning is very much the same in each case. In be-

ginning typewriting[1] (by the 'touch' method, let us suppose, in which the keyboard is not visible, though a diagram of it may be placed before the subject to guide his movements), the first task is to learn the location of the single letters and the finger movement necessary to reach each letter from the primary position of the hands. When, after considerable practice, the learner is able to strike any letter as soon as he thinks of it, by a single direct movement of the proper finger, he is able to write with some little speed, and may imagine that he has learned typewriting, and that his further progress will simply consist in speeding up and smoothing off the process as he is then executing it. But if he continues his effort for greater speed, he finds, after some time, that he is writing in a different way, no longer spelling out every word, and writing each letter by a separate act, but treating familiar words as wholes, and executing the combination of letter movements that produce the word as a single complex act. He even comes, with continued practice, to write familiar phrases as wholes. Evidently he has developed mechanisms for producing fixed series of finger movements, and works with these larger mechanisms instead of with the smaller mechanisms which he at first developed for making single finger movements at the thought of single letters. These simplest units have come to be geared together into higher units. The whole developed system of typewriting mechanisms possesses a high degree of flexibility, since either the single letter reactions or their numerous combinations can, according to circumstances, be touched off.

[1] See W. F. Book, *The Psychology of Skill*, 1908.

The process of learning to telegraph[1] goes through the same stages, beginning with letter units, and adding word and phrase units later. The telegrapher, moreover, learns not only to write or 'send' by letters, words, and phrases as units, but also to 'receive' in the same way. At first, when he is receiving a message by ear from the sounder, he must identify the single letters in the series of clicks that come to him, and so laboriously spell out the words. As long as he is in this stage, his receiving is too slow for regular line work. By dint of continued practice, he is able to recognize the longer series of clicks that represents a word, without picking out the separate letters in that word; and the same with familiar phrases. He develops mechanisms of the 'higher unit' variety for recognizing words and phrases, and habitually makes use of these, while he is always able to utilize also the simpler mechanisms for recognizing single letters when the message comes in unfamiliar words.

'Higher unit mechanisms', so clearly evident in linguistic performances, from speaking to telegraphing, are also present in all skilled action; and, in fact, skill consists very largely in the use of such labor-saving machinery. As to the process by which these higher units are developed, we have one or two significant indications.

When the compound act to be learned is of a motor sort, as in typewriting or in sending telegraphic messages, an essential element of the process of learning seems to be a forward-looking or anticipation. While

[1] Bryan and Harter, *Psychological Review*, 1897, IV, 27 and 1899, VI, 345.

one simple movement is being executed, attention is already directed towards the movement that is next to follow. When the learner has so far progressed that he can thus anticipate, the jerkiness previously visible in his movements tends to disappear, since, instead of halting at the end of the first movement and then initiating the second, he goes through the preliminaries of the second movement while actually executing the first, and so is able to pass smoothly from one to the other. When this manner of executing a series of movements has become habitual and easy, the series becomes a single continuous act.

When the compound act to be learned is one of a perceptual sort, as in receiving telegraphic messages, anticipation of what is to come is unsafe, and the mode of procedure adopted is to keep the attention behind, instead of ahead of the external end of the process. That is to say, in receiving telegraphic messages, one who is beginning to develop skill allows a number of clicks to come and go before definitely settling with any of them. He keeps behind the clicks in his reading of them, and by this means is able to fix his attention on the whole series corresponding to a word or phrase. He so adjusts his attention that his reaction to the clicks will be determined by a whole lot of them instead of by one or two.

While the process of learning to perceive and recognize complex objects is not so easy to study as the process of making complex movements, this observation on telegraphers is probably a good sample of what occurs in other analogous cases—the perception of a complex is possible by virtue of such an attitude of attention as permits the complex of stimuli to act conjointly in deter-

mining the perceptual act. We have some evidence of this sort of thing in experiments[1] on memorizing long lists of numbers or nonsense syllables. In such work, the subject spontaneously groups the numbers or syllables, and the division into groups precedes careful study of the single items. The group is apprehended first as a unit, and then analyzed into its parts, the parts being perceived in their relationship to their group. Only by taking the material in such larger units is it possible to memorize economically.

A false impression may easily be created by confining the examination of 'higher units' to typewriting and telegraphy, in which it is customary, if not absolutely necessary, to begin by mastering the lower units—here the letters—and in which the higher units make their appearance only after the lower units are so well mastered as to be automatic. Modern experience in the teaching of reading shows that there it is not necessary to master the letters before dealing with words as units. The printed word, as a whole, has a characteristic appearance which can be recognized by the child before he knows the letters put together to make the word. His perception of the word is at first rather vague and unanalyzed, though definite enough to identify the word; and the child's further progress in reading consists partly in the analysis of the word units into letter units. 'Higher units first, with more or less of later analysis into smaller units' is probably the rule rather than the exception. The child perceives an object first as a whole; later he may observe how the object is made up. The adult procedure also is to begin with the total

[1] G. E. Müller, *Zur Analyse der Gedächtnistatigkeit*, 1911, 1913.

impression of a complex object, and to advance, if and as far as necessary, to the details. Many a face can we recognize which we cannot describe in any detail. Oftentimes, what we are able to tell about a well-known face amounts to little more than that it is a human face. We know it as a characteristic whole, but we do not know its parts. An artist, under the necessity of reproducing the face, notices details, but even he does not push his analysis to the limit. He does not propose to map every little marking, and neglects what is of no consequence for his purpose. This is typical of the process of observation. Observation starts with unanalyzed wholes and proceeds as far as necessary in the detection of details. The whole with which it starts is not necessarily the largest whole that can be apprehended; and accordingly the reverse process of combining smaller units that have been observed into larger units also goes on, but the movement from the whole to the part is the more characteristic of perceptual acts. Nor is it by any means absent from motor acts. In learning to use a tool, the start is usually made by a rough approximation to the movement as a whole, and progress consists partly in noticing details in the manipulation which are capable of improvement. A complex motor act, performed at first as a rough whole, may next be analyzed into a sequence of elementary acts, and these separately mastered and then recombined into a smooth, continuous process, as already described; so the act becomes a whole again, but a more skillful whole than at first.

Besides the combination of instinctive movements into learned compounds, there is some indication that

a compound movement provided by nature can be broken up, so that a learned movement may consist of a part of an instinctive movement. The most obvious cases are the various tricks of movement that children delight in—winking one eye, bending a finger at one joint, etc. Of more practical significance is the ability to move single fingers as in piano playing, an ability which is only learned by considerable effort, because the natural tendency of the fingers (except the index) is to move together. Some doubt is thrown on all these cases by the fact that the young baby may sometimes be observed to do such things as wink one eye or move the fingers separately, though in an incomplete way; possibly, we should infer, the process of learning these isolated movements later is less a process of breaking up a natural coordination than a process of getting control over a simpler and little used but still natural movement. Whether the analytic process, on the motor side, ever gets beyond the simplest coordinations provided in native equipment, is thus subject to doubt, though there is no doubt that analysis of the motor compounds that naturally occur in response to a given situation is a common process of learning. On the perceptual side, analysis is still more in evidence, in the sense that we learn to notice and respond to elements and features of a complex object or situation which at first we only perceive as a totality. Thus we become observant of size, shape, color, number, and numerous other qualities and relations of things.

The simplest instance of the analytic process is perhaps that already mentioned of the mouse which, being brought to a halt in its natural reaction to a situation as

a whole by encountering an electric shock, came to react to particular features, such as a black or white arch over a door, to which by nature it paid little attention. It is perhaps pretty generally true that a check encountered in the course of natural unanalytic action affords the occasion for analysis.

Analysis and synthesis—to use these old terms in a somewhat new way—are two general directions in which the acquisition of learned equipment proceeds, additional to the simple process typified by the conditioned reflex. The analytic process is better known in perceptual reactions, where it seems to consist, as just said, in being brought to a halt in the course of unanalyzed reaction to a situation as a whole, and, while in this suspended state, being affected by elements of the situation which previously had no distinct influence. The synthetic process is visible in both perceptual and motor reactions. Either perceptual or motor reactions, once they have become easy through practice, may be combined into 'higher units'. The drive actuating the process of combination is nothing else than the struggle for speed, efficiency, economy—in a word, for success in whatever undertaking is on foot. The means by which the combination is realized is an enlarging of the span of action, taking the form, in motor reactions, of anticipating the movements that are just ahead, and, in perception, of holding back from reacting to a single stimulus till others also have a chance to exert their influence; in either case, a coordination is effected between two or more elementary reactions, and a higher unit of reaction results which may, by repetition, become a well-trained and fixed possession of the individual.

Learned equipment, so far as indicated above, consists in new 'mechanisms'; and the question remains whether there is any similar development by the individual of new 'drives'. The conditioned reflex type of process certainly occurs with drives, as already illustrated in the case of laughter. That is, the mirthful tendency, which, once aroused, has the character of a drive, becomes attached in the course of experience to other than its natural stimuli. The same is true of all instinctive tendencies. They come to be aroused by stimuli that originally had no power to arouse them.

Native drives may also become combined into mixed or compound motives. A given object may be an effective stimulus for two or more natural tendencies, and if the object frequently recurs in an individual's experience, these tendencies may become organized about that object as a center into a 'higher unit' of drive, analogous to the higher units spoken of above in the case of mechanisms. This is essentially the process by which 'sentiments' of love and respect, and others, are developed, according to the view of Shand and McDougall.[1] Such a compound drive may be organized about a single object or about a class of objects. Children arouse in adults the impulse to protect them and also the tendency towards amusement; and the attitude of adults towards children is a more or less fixed compound of these two tendencies. One's own child arouses in addition the sense of possession and pride; and thus the motive that prompts the parent in his dealings with his child is rather a mixed motive, and a motive that

[1] A convenient reference is the latter's *Social Psychology*, Chapters V and VI.

has been developed in his experience. In the same way, one's attitude towards persons of the opposite sex is likely to be composed of sex attraction, curiosity, fear and uncertainty, lack of complete sympathy, and esthetic appreciation; and this attitude is not static but a driving force that helps to determine behavior. Similar attitudes grow up in the course of experience towards servants, masters, and other classes of persons. It would be a mistake to suppose that behavior towards any such class of persons is a purely automatic learned response. There are, indeed, certain fixed habits of response in the way of manners; but the behavior of an individual towards persons of a given class may vary indefinitely in changing circumstances, and all the while remain 'in keeping'. Instead of merely arousing a purely motor response, a person of a given class arouses first of all the habitual attitude towards members of that class, and this attitude (or, better, 'drive') contributes to the selection of the particular mechanisms that give the overt behavior.

Whether combination is balanced, as in the process of acquiring mechanisms, by an analysis that breaks up natural compound drives and so in effect increases the diversity of motive forces, is rather questionable; at least, there is nothing definite to say on the matter. The partial elimination of a drive from the individual, as the result of his training—a process analogous to the negative adaptation or dissociation spoken of under the head of mechanisms—is undoubtedly a fact. We learn not simply to avoid the overt expression of anger, but even to avoid getting angry and being easily 'offended'. Not that anger as a motive force is entirely eliminated

from any one; but its influence is diminished in many. The child is angered and strikes; the effect of this behavior being often disagreeable to himself, he learns to restrain his actions when angry; but ungratified anger being itself a disagreeable state, he later learns to restrain his anger also, and to go on the even tenor of his way, driven by other motives and undeflected by the distraction of getting angry.

Besides the elimination of drives, their attachment to new stimuli and their combinations, there is another source of acquired motive forces. It is a general principle of human activity that we are interested in overcoming difficulties and interested, on the other hand, in what we can do successfully—in a word, we are interested in successfully overcoming difficulties. The difficulty may lie on the side of motor execution of an act or on the side of perceiving and grasping a state of affairs, or on both sides at once. Action that is too easy because all the difficulties have been smoothed away or already subjugated by well-formed habits is automatic rather than interesting, and action that meets with unsurmountable obstacles is distinctly annoying; but action that encounters resistance but overcomes it without resorting to the last ounce of effort is distinctly interesting. Now, as we get acquainted with the world, we learn to perceive and apprehend objects and thus generate new interests; for every object that is sufficiently novel to cause some difficulty in apprehension, while still within the power of our trained powers of perception, is an interesting object to us, and we are driven to apprehend it by the impulse to surmount the difficulty that it presents. In the same way, a motor

activity for which we have well-trained mechanisms, while still sufficiently novel to tax our powers somewhat, is an interesting action to perform, and we are driven to its performance by the impulse towards overcoming the surmountable that it offers. Those who, like McDougall, attempt to trace all motive force to the instincts, would regard such acts as driven by the native impulses of curiosity and manipulation; but in so doing they miss the point. There is not an undifferentiated reservoir of motive force, to be called curiosity, that can be led off into one or another act of perception; but curiosity is simply a collective name for an indefinite number of impulses, each of which is dependent on the existence of some degree of ability to perceive and understand a certain object. The child shows curiosity first with regard to bright lights and sharp contrasts, which are the natural stimuli for his eye movements; later, after he has learned to some extent to know persons and things, his curiosity is directed towards them; and when he has begun to perceive the relations of things, he shows curiosity regarding these relations. His capacity to acquire mechanisms for handling various sorts of objects is native, to be sure, but it is only as this capacity is developed by training that the curiosity appears. In other words, curiosity, the driving force in any perceptual act, is better conceived as the interest in that particular perceptual act, or, more intelligibly, in that particular object. As then the child becomes able by his experience to apprehend objects, he comes to have new interests, new driving forces for his perception. Similar remarks can be made regarding the development of interest in skilled movements.

The point at issue is very well brought out in the case of a game of skill. The motive that drives the chess player to his chess, or the golf player to his golf, is not at all adequately accounted for by referring to an undifferentiated reservoir of curiosity or manipulativeness. The one is driven precisely by an interest in chess and the other by an interest in golf. The driving forces are specific, and acquired in the learning of these games. In the same way, while a man may enter a certain line of business from a purely external economic motive, he develops an interest in the business for its own sake (unless he is entirely out of his element), as he acquires mastery of its problems and processes; and the motive force that drives him in the daily task, provided of course this does not degenerate into mere automatic routine, is precisely an interest in the problems confronting him and in the processes by which he is able to deal with those problems. The end furnishes the motive force for the search for means, but once the means are found, they are apt to become interesting on their own account.

In short, the power of acquiring new mechanisms possessed by the human mind is at the same time a power of acquiring new drives; for every mechanism, when at that stage of its development when it has reached a degree of effectiveness without having yet become entirely automatic, is itself a drive and capable of motivating activities that lie beyond its immediate scope. The primal forces of hunger, fear, sex, and the rest, continue in force, but do not by any means, even with their combinations, account for the sum total of drives actuating the experienced individual.

V

THE FACTOR OF SELECTION AND CONTROL

There is a certain analogy between a man and a manufacturing plant—a big, complex plant, equipped to deal with many sorts of raw material and to turn out a great variety of finished products. Beginning with an outfit of fundamental mechanisms, this plant has developed and installed a great variety of special linkages, combinations, and economies adapted to the work it has found to do. In so far as the future demands made upon it remain the same as those it has met in the past, it is equipped for meeting them; if new demands arise, new equipment will have to be developed; if old equipment is present for which there is no further demand, it is not thrown out—there being no way of doing that—but it grows stiff and rusty with disuse, and may be altogether lost sight of till some day when, perhaps, the old demand arises again, and the old machine responds as best it can, and may prove, after being limbered up by activity, to be still a good functional unit—or may need to be mostly reconstructed. An inventory of the equipment of the plant at any time would show some pieces in constant use, some in frequent use and perfect working order, and others of all degrees of readiness or unreadiness, due to the frequency and recency of their past use. Some pieces are falling apart through disuse; some have never been fully constructed; and some

that never have found a use are still in the vague, unformed state in which they were provided in the original outfit of the plant. At any one moment, only a small part of this total equipment is in action, the rest remaining in a resting condition, from which it is awakened—to shift to terms more nearly descriptive of what happens in a man or animal—by something acting upon it as a stimulus.

A man carries around with him a vast assortment of possibilities of action. The best conception of a 'possibility of action' is undoubtedly that of a neural mechanism so connected with other neural mechanisms and with the sense organs and muscles as to give the action when aroused. The question now before us is as to what determines which of the many possible actions shall become actual at a given time—as to how some are activated while others are left inactive—as to the arrangement by which drive is at any moment applied to certain mechanisms and not to others. It is a question of selection, management, and control.

The fundamental thing in selection is undoubtedly the linkages, some provided by nature and others established by previous training, between actions and their exciting stimuli. Actions are *reactions*, being connected by nature or training with certain stimuli; and unless the stimulus occurs the reaction does not occur, but its mechanisms remain in the resting condition. The mechanism for flight exists in good working order in an animal, but unless the situation confronting the animal contains something that the animal naturally fears or has learned to fear, the flight mechanism is not activated. Thus the selective agency is very largely

to be sought in the situation confronting the animal or man.

Little further would require to be said regarding selection, if it were true that each stimulus were simply joined to one reaction, each reaction to a single stimulus, and if stimuli always came one at a time. As a matter of fact, none of these things is true. The same stimulus may have become linked with two or more reactions, and the same act with two or more stimuli; and the situation presented is always complex, containing a number of elements that are capable of acting as stimuli to different reactions. Under such conditions, the question of selection is very real and not at all easy to answer in full.

Let us revert for a moment to the cat in the puzzle-box. The situation is complex: confinement, food outside, bars, spaces, and other points that can be attacked. The cat possesses a variety of reactions to this situation. It brings out its reactions in succession, attacking first one and then another part of the cage—or, as we might also say, responding first to one and then to another feature of the situation. Some one feature has an advantage over the others, and gets itself responded to first; but it loses its advantage when reaction to it does not bring the consummation at which the animal is aiming, and some other feature takes its turn as the stimulus evoking the next reaction. As related to the problem of selection, the cat's behavior shows: (1) several possible reactions to the same situation; (2) the occurrence of the reactions one at a time and not simultaneously; (3) an advantage of some of these over others; (4) that, on being thrown back defeated from one line of attack, the

cat becomes responsive to other features which at first did not arouse reaction; and (5) that all of these reactions are of the nature of preparatory reactions, leading towards the consummation of escape and eating, and that without the drive towards this consummatory reaction, none of these particular preparatory reactions would be evoked, but still others, such as lying down and purring, might take their place. Simple animal behavior thus furnishes a fairly complete outline of the psychology of selection and control; and it is only necessary to elaborate each of these five points and to show their application at different levels of behavior, including the intellectual and moral life of man.

MULTIPLE POSSIBILITIES OF REACTION

Evidently there would be no room for selection except for the existence in the individual of two or more mechanisms responsive to the same object or situation. Jennings[1] has demonstrated varied reaction in the lowest forms of animals. Often a protozoan possesses two forms of avoiding reaction, the one, less energetic, consisting in a simple contraction or bending aside; the other, more energetic and efficacious, amounting to flight. Which of these reactions shall actually be aroused by a given stimulus depends not only on the stimulus, but also on the inner condition of the animal, which in turn is largely determined by the stimuli that have gone just before. A weak but somewhat harmful stimulus gives at first the weak avoiding reaction, but if repeated at short intervals comes in time to produce flight. A stimulus that is harmless, though much like

[1] *Behavior of the Lower Organisms*, New York, 1906.

a harmful stimulus, is likely to give at first the weak avoiding reaction, and then, after a number of repetitions, no reaction, the animal having become adapted to it. Thus the animal possesses three possible responses: the weak avoiding, the strong avoiding, and rest; and which of these it shall put forth in response to a given stimulus depends not alone on the stimulus, but on the animal's own internal condition. The inner condition thus appears as a selective agent in determining which reaction shall be made.

The same thing appears in other instances of animal behavior. Curiosity and fear may both be excited by the same strange object; in fact, you may sometimes see an animal almost balanced between the two, now approaching the object, then suddenly taking flight, only to come back a moment later to explore further. Fighting and toleration, or food-getting and disgust, may similarly be almost balanced against each other.

A strange situation always offers a number of different objects calling for attention and exploration. Placed in unfamiliar surroundings, a man notices first one, then another and another object, thus going through varied reaction of the perceptual sort. At any time a large number of stimuli act upon us, through eyes, ears, and skin; but some one of these stimuli is at any moment attended to rather than the others, or it may be that no one of the external stimuli receives attention, the individual being absorbed in his own thoughts.

In thinking or reverie, one idea calls up another, by association, as we say; the first idea being the stimulus that evokes the second as a response. Now any idea

has in the past become asssociated with a number of others, and can call up any one of them. This is nicely brought out by an experiment in what is called 'free association'. The experimenter instructs his subject to respond to a word which is to be spoken by any other word, the first suggested by the given word. If the stimulus word given is 'window', the response made by one person will be 'pane', by another 'frame', by another 'curtain', by another 'house', by another 'view', by another 'Gothic', any one of which is recognizable as easily suggested by the stimulus word, though only one or a very few will occur instantly to any one person. In associative thinking, in fact, varied response is even more in evidence than elsewhere, but everywhere in animal and human behavior the principle holds that more than one response is available to any situation, and that inner conditions must be taken into account in explaining the actual occurrence of one rather than another reaction.

THE MUTUAL EXCLUSION OF ALTERNATIVE RESPONSES

Though more than one response to a stimulus or complex of stimuli is possible, only one, as a general principle, is actually evoked at a given instant. The case in which this principle is least clear is that of free association, just mentioned. Here it sometimes happens that more than one response word is suggested at the same instant, or so nearly at the same instant as to seem so, introspectively. Yet even here it is evident that many responses that are perfectly possible for the individual are actually not aroused at a given moment. The opposite principle, which might from physical

analogy be expected to hold, according to which every response that has become linked with the stimulus word should be evoked, some, perhaps, strongly and others weakly, in accordance with the closeness of the linkage—this principle does not hold at all, but there is at least a close approximation to the principle first stated. In the protozoan, either the strong or the weak avoiding reaction, or no reaction, is at any moment aroused; in the cat in the puzzle-box, a succession of reactions appears, one at a time; in the animal balanced between fear and curiosity, one or the other tendency has at any instant the advantage and the other is for that instant suppressed.

The mutual exclusion of alternative reactions appears very clearly in the sphere of reflex action. Let the hinder part of a dog be rendered a purely reflex machine by a cut across the spinal cord, separating the lower or rear half of it from the influence of the brain. This 'spinal animal' shows the reflexes in a relatively pure and simple condition, undisturbed and ungoverned by the brain. If now one hind paw is pinched, that paw is drawn up, while the other leg is extended, but if both paws are pinched at the same time, both are not drawn up, but one or the other is drawn up and the other extended—in other words, one of the two compound reflexes that are simultaneously excited is actually evoked and the other is excluded. A somewhat more complex reflex is that of scratching when the flank is irritated. If the right flank is irritated, the right hind leg is brought up and scratches, while the left hind leg is extended and supports the trunk during the scratching movement. If both flanks are simultaneously ir-

ritated, it would be impossible to execute both scratching movements, right and left, simultaneously, since either movement requires the leg that is not scratching to be extended. It is impossible, we say; but physically it is impossible only in the sense that both movements could not be efficiently carried out together, and we might expect the result of simultaneous excitation of both to be a sort of compromise, analogous to the parallelogram of forces, giving a half-way position and action of each leg. No such compromise occurs—and it is one of the fundamental peculiarities of animal mechanics that it does not occur—but what happens is that either the right or the left leg will be brought up and scratch, while the other is extended. If, however, the bilateral irritation continues, this first response gives way suddenly, after a time, to the opposite. In other words, one of the two possible responses to the situation is executed at any one time, and the other cut out or inhibited; but, if the situation continues unchanged, there is a shift, the inhibited response having its turn, while the other is now inhibited.

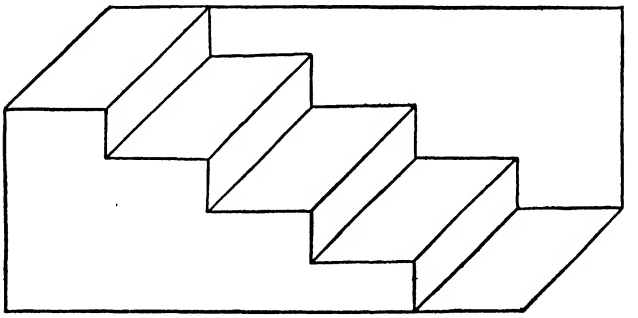
This principle of the reciprocal inhibition of antagonistic reactions is one of the important contributions of Sherrington[1] to the knowledge of reflex action. It is not the only principle that he found operative. Sometimes two reflexes are aroused together, but that is when they work together harmoniously, and in fact unite to form a compound reflex. Both of these principles—that of the reciprocal inhibition of antagonistic reactions, and that of the union of allied or harmonious reactions—can be observed in mental as well as in reflex action.

[1] See his *Integrative Action of the Nervous System*, New York, 1906.

One instance that is not far removed from the reflex level is seen in the movements of the eyes towards objects in the field of view—in 'looking at' objects. An object seen off to the side, in 'indirect vision', acts as a stimulus to turn the eyes in its direction, by which motion the object comes into clear vision. Very often it happens that there are two objects in the field of view, one to the right and the other to the left, simultaneously attracting the eye. If the eye followed the law of the parallelogram of forces, it would remain staring at some point intermediate between the two that had attracted it. What it does is to disregard one object, for the moment, at least, and turn towards the other. After this is examined, the object at first neglected may have its turn. These eye movements are a type of the exploratory reaction; and what is true of this case is true generally of the exploration of a complex situation, or, as we may otherwise express it, of attention to a complex situation. Of all the stimuli that simultaneously tend to attract attention, only one gets attended to at any instant, but several do so successively. The other principle, indeed, of union of harmonious responses, comes also into play in the sphere of attention, in that two objects can be attended to at once, provided they can be perceived as parts of a unitary though compound object.

The two principles come out clearly in the case of binocular vision. The two eyes, being in slightly different places, get different views of any near-by solid object, but we do not ordinarily notice these two appearances, but, combining them, perceive a single object so placed in space as to give the two views to the two eyes.

If, however, the stimuli affecting the two eyes are not such as will unite to give the perception of a single object, we get reciprocal inhibition, or, as it is here called, rivalry. Let a red glass be held before one eye and a green glass before the other, and let the eyes be directed towards a white wall. Then, according to the stimuli affecting our eyes, we should see a wall that is red and green at the same time and place; but such a combination as this we are unable to make. What we see is, first,

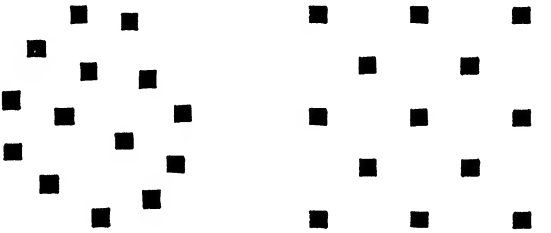


THE STAIRCASE FIGURE

a red wall, the green entirely disappearing, and then, after a time, a green wall, the red disappearing; and so on alternately. Our visual apparatus behaves in the same way as the spinal animal stimulated at once to right and left scratchings.

Another striking instance of the same thing is afforded by what are called ambiguous figures, many of which are drawings easily suggesting solid objects, but drawn without perspective, and equally well fitted to represent either of two different solids. As you exam-

ine such a drawing, you see it first as one of the solid objects and then as the other, the two alternating as in the case of binocular rivalry. The simplest ambiguous figure is perhaps the dot figure, the dots being either regularly or irregularly arranged. In either case, the dots, as you examine them, fall into patterns, and the patterns change from moment to moment. You make, that is to say, a variety of perceptual reactions to the same continuing situation, but you make only one at a time. These instances of alternating and mutually



TWO DOT FIGURES

exclusive perceptions are curiosities, but in a general way they are typical of all perception, since always the situation confronting the observer is capable of arousing different percepts, only one of which occurs at any one moment, though several may occur in succession.

ADVANTAGE POSSESSED BY ONE ALTERNATIVE REACTION OVER THE OTHERS

That one of the various alternative reactions which is first evoked evidently has a certain advantage over the others, and the question arises as to what gives it this

advantage. When a number of stimuli are acting simultaneously on a man or animal, the most intense of them has an advantage over the others, and is likely to be the first noticed and reacted to. A moving object has an advantage over one that is at rest; a sudden stimulus over one that has continued for some time with no change, or only a gradual change; certain colors have an advantage over others that are not so 'striking', and certain objects, in the case of the human child especially human faces, have an advantage over other objects. All this by force of original nature.

The advantage of one reaction over another must be sought on the side of the reaction as well as on that of the stimulus. Certain reactions are more imperative than others, and have the 'right of way' through the nerve centers. The avoiding or self-protective reactions have an advantage over others, so that a painful or threatening object usually gets itself reacted to in preference to any other stimulus that may be present. Thus a slight rustling noise may get a response in preference to bright or otherwise interesting objects. The principle of economy also makes its appearance here, as shown by the fact that a stimulus will ordinarily evoke a reaction of moderate strength before it can elicit one of great force. This was seen in the behavior of the protozoan when affected by a harmful stimulus; the first reaction called out was the weak avoiding reaction, and the strong reaction only occurred when the weak did not suffice. In general, the strength of a reaction is apt to be more or less proportional to the strength of the stimulus, so that for any strength of stimulus, a reaction of corresponding force will have the advantage.

Besides these advantages naturally possessed by one stimulus or reaction over another, there are other advantages due to training. When two reactions have become attached to the same stimulus, one may be more strongly attached to it than the other. The connection between stimulus and response is strengthened by vigorous exercise of the connection, by frequent exercise of the connection, and by recent exercise of the connection. Each of these factors has something to do with the strength of the connection between stimulus and response, and their sum total determines the total advantage possessed by one or another response to the same stimulus, so far as this advantage is determined by the 'law of exercise'. Besides this, the 'law of effect' must also be taken into account. When one of two possible reactions to a given stimulus has in the past led to punishment, that response is placed at a disadvantage as compared with the other which has not been punished. When the reaction to a stimulus, however frequently made in the past, has given way to a condition of negative adaptation, that stimulus is placed in a position of disadvantage as compared with a stimulus to which adaptation has not occurred. When reaction to one feature of a situation has resulted in a check or failure, that stimulus is placed in a position of disadvantage; and when reaction to a particular feature has brought success and satisfaction, that reaction has the advantage over all others that are capable of being aroused by the given situation. Thus the advantage of one possible reaction over another, due to the present strength of the connection between situation and re-

sponse, is determined in a very complex way by the original nature and past history of the individual.

SHIFTING OF ADVANTAGE FROM ONE REACTION TO ANOTHER

The initial advantage possessed by one reaction may disappear quickly as the situation continues unchanged, and thus the phenomenon of varied reaction be produced.

The simplest case of this is perhaps to be found in the often-mentioned negative adaptation to a continued or frequently repeated stimulus. A noise which at first startles us, *i. e.*, arouses that peculiar form of the attentive or exploratory reaction known as the reflex start, no longer arouses this reaction if immediately repeated, and comes soon to be altogether overlooked. At first possessing an advantage over other stimuli, it quickly loses this advantage. An object which at its first appearance attracts the eye in preference to any other object in the field of view cannot hold the attention for long unless it is a complex or moving object and so capable of arousing a number of different perceptual reactions—in other words, the attention is not held for long by a simple and unvarying object. We become adapted to it, and something else gets the advantage and arouses attention in its turn.

This fact appears with most precision in the rivalry between the two contrasting fields of view, or in that between the two interpretations of an ambiguous figure. In binocular rivalry, the more brilliant or striking color has at first the advantage, and excludes the other from conscious perception; but shortly the latter gains the advantage and excludes the former. The first

reaction has become fatigued, or it might be better to say that negative adaptation has set in against it. In ambiguous figures, the law of past exercise comes first into play, and the figure is perceived as the object most frequently presenting this appearance; but again fatigue or adaptation enters, and the most usual interpretation loses its advantage, and gives way for a time to the less usual, only to reassert itself as soon as fatigue or adaptation has operated to the disadvantage of the latter. Adaptation is probably a better concept to work with here than fatigue; at least, in some cases the dropping out of consciousness of an object that was at first perceived can scarcely be regarded as a case of fatigue. When the ticking of the clock, to which I have become adapted, suddenly ceases, I 'wake up' with a start, and a sense that something, I do not know what, has happened. This could scarcely occur if I had simply become fatigued to the recurring noise, for fatigue would mean that my mechanism for dealing with the noise had been thrown out of function—its fuses burned out, as it were—and then cessation of the stimulus would produce no sudden response, but simply give an opportunity for the gradual recovery of the fatigued mechanism. But adaptation to the noise might very well mean that some mechanism was dealing with it in a way not to interfere with other, more conscious processes, but rising to meet it rhythmically, in time with its periodical recurrence; and that, on the cessation of the noise, this mechanism, not receiving the stimulus which it was 'rising to meet', gave a sort of jolt to the other active mechanisms and so produced a sudden disturbance in their action. However this may

be, fatigue or else adaptation seems a good explanation of very many cases of displacement of advantage from one stimulus to another, and from one reaction to another.

Another important cause of shifting from one reaction to another has already been mentioned in connection with the subject of learning. When the first reaction made results in pain or a check, it loses its advantage for the moment, at least, and gives way to some other reaction.

THE DRIVE AS SELECTIVE AGENCY

The most characteristic thing about selection is brought home to us on considering attentively this last-mentioned case, in which a *check* acts to deprive one tendency to action of its initial advantage and transfer this advantage to another tendency. A check implies a trend in a certain direction. Failure implies a goal that is not reached. When the cat, squeezing between the bars of a cage and meeting resistance, turns to some other point of attack, it is because, in common speech, it is trying to get out. It is this tendency towards escape and securing the food placed outside—whatever form the tendency may take in the cat's consciousness—that controls its reactions to the various features of the situation confronting it. Without this tendency, it would not attack the parts of the cage as it does, nor restlessly shift from one reaction to another till some one gave success. This tendency to escape is a mechanism aroused by the stimulus of confinement with food outside; once aroused and not immediately satisfied, it acts as a drive to the mechanisms that pro-

duce the various specific reactions of the cat to different parts of the cage. It acts as a reinforcement to certain reactions, selecting them one after another; and it acts as an inhibition to other reactions, preventing the cat, for example, from reacting to a convenient spot by lying down there. The drive acts as a selective agency, as a controlling agency.

The same thing is seen in another animal experiment already described. A rat, on being first placed in a strange maze, reacts by exploration; after once finding food, it behaves in quite a different way, without random exploration, but with urgency and haste. It has got a drive which eliminates otherwise preferred reactions and greatly increases the energy of behavior.

The selective force of drives is seen in all phases of human behavior, and nowhere more clearly than in observation and mental work.

What shall be observed in a complex presented situation is determined not only by such factors as intensity, suddenness, and movement of a stimulus and preformed habits of attention, but very much by the interest that is momentarily dominant. The present interest is a drive selecting certain objects for observation. Interest sometimes takes the definite form of a question, and objects which have been overlooked a hundred times will come into notice when a question is asked regarding them. Questions suggested or suggesting themselves to the beginner in botany, for instance, cause him to see plants and parts of plants that have been before him all his life but never observed before. The importance of the question as a spur to accuracy of observation is fully recognized in the sci-

ences; to be sure of your fact you must have been ready and looking for it, an unprepared observation being generally unreliable. We do not become scientific observers by simply going out into the presence of nature with the general intention of observing, but by first getting some question in mind which we can answer by observation of nature. General familiarity with a thing, in the sense of having lived with it, does not qualify one as a scientific expert regarding that thing. One may prove to have little exact knowledge regarding a familiar thing, simply because one has been satisfied with a very summary observation of it and has taken it thenceforward as a 'matter of course'. The question, then, is decidedly to be called a drive; it arouses certain activities which would not be aroused by the external objects alone. It reinforces the effect of certain objects and incidentally inhibits the effect of other objects, for observation sharpened by a question is keen only for the answer to that question and neglectful of whatever is irrelevant to it.

Instead of speaking of the question as the driving force in keen observation, we might have said that curiosity was the driving force; but it is not curiosity as a general motive, but curiosity regarding some particular thing. 'Curiosity' sounds like a general motive force leading to observation of anything and everything. Now there is such a thing as a general exploratory tendency, leading the child, especially, to go out in search of the novel. But the essence of interests and questions is to be specific. It is the capacity to become interested in certain classes of object, and in certain problems regarding objects, that leads to systematic

and painstaking observation. The motive force leading to the great activity of the scientific observer is not some vague force in the background, but is bound up with the actual perception and understanding of objects. That is to say, the interest in a class of objects is inherent in the mechanism for dealing with that class of objects. It is not a general curiosity, but interest awakened in a certain class of objects, that furnishes the drive for observation.

In mental work, the factor of selection is very important. Leaving to the next chapter the more original sort of thinking, we shall consider here the routine and smooth-running forms of mental activity. Habit and previously formed associations are important here, and the conclusion might easily be suggested that these forms of mental work were purely automatic responses to presented situations, requiring no inner drive or selective agency. This is very far from being true. The multiplication and addition tables become to the well-trained computer very nearly automatic; but the point is that any two numbers, as eight and five, have associations both with their sum and with their product. It is a case of alternative reactions, and the question is how the computer manages to use the right set of associations for the work in hand. If you have before you several pairs of one-place numbers arranged in the form of examples in addition or multiplication, and say to yourself, 'Add these', you find that the sums immediately come to mind on looking at the examples; but if you say to yourself, 'Multiply these', the same examples call up the products. Evidently the intention of adding or of multiplying switches in one set of asso-

ciations and switches out the other. In such cases the selective agency is often called the 'mental set' or adjustment. The arithmetical mechanism of the computer is an adjustable machine that can be set for any one of several operations. When an adjustment has been well trained, it becomes itself almost automatic and works without coming much to consciousness, but it is none the less effective. The mental set, or intention of performing a certain operation or solving a certain problem, is a drive, reinforcing certain associative connections and inhibiting others, and thus exerting a selective influence.

In reading, the context already taken in by the reader is a selective agency, determining which of several familiar meanings a given word shall suggest, and doing its work so well that generally only the appropriate meaning occurs to mind at all. Here is a word that has half-a-dozen familiar meanings. Standing alone, it would suggest one or another of them, according to the relative strength of the associations as determined by past exercise, etc. But in context it calls up one particular meaning without reference to the relative strength of the various associations, provided, of course, that all are sufficiently strong to work easily. The determining factor is not the past history of the associations, but the present context. Nowhere is the selective factor more in evidence than in reading a story or watching a play. The situation as it has gradually taken shape in the mind of the reader or spectator gives the right interpretation to words and actions that, apart from their context, might have a variety of meanings. Comprehension of the general situation is a

drive, producing greater interest and mental activity on the part of the observer than could possibly be aroused in him by isolated words or actions, and also selecting his associative reactions to them. Two effects of a drive are thus brought to light: general stimulus to activity, and selection of the particular activity that shall become active.

In motor behavior and the life of action generally, these two effects of the drive are in evidence. Something analogous to the 'context' operates to select from among the large repertory of acts those that fit the case. The ball player could do many things with the ball that has come to him; but unless he 'loses his head', he does the one thing that the whole situation demands. Decorum means the same kind of control exerted over action by perception of what the situation demands. Understanding the state of affairs means a certain 'frame of mind' that favors certain acts and thrusts others aside. Undoubtedly the factor of selection operates in much the same way in the broader conduct of life as it does in the comparatively narrow activities, such as computing, where its effects can be definitely noticed.

In reviewing this discussion of the factor of selection, the reader will be left with the impression that much has been said of selection and its manner of working, but little of that which selects. What is the selective agency? Now the gist of the whole discussion is that there is no agency exclusively devoted to selection, no factor of selection that is nothing more than that. A tendency towards some consummatory reaction acts as a selective agency, but it is at the same time a tendency

towards a definite end. An interest acts as a selective agency, but it is also an interest in some specific thing or class of things. A question acts as a selective agency, but a question has always a specific content. A context acts as a selective agency, but the context means a concrete situation, with characteristics peculiar to itself. Selective agencies are many, each of them being a special tendency or interest. Selectiveness is a property of any tendency or interest, and not the property of some one general agency existing alongside of the specific tendencies. This is but to repeat what has been said before, to the effect that every drive is also a mechanism, and that any mechanism may conceivably be a drive.

This doctrine does not, however, imply, as might appear at first thought, that the personality is a mere collection of tendencies, with no organization and no control. Some tendencies and interests are stronger than others in the individual, and a well-integrated personality is organized about its master motives, these acting as selective agencies with respect to other tendencies. Few personalities are so thoroughly integrated that tendencies usually subordinated may not occasionally break away from control, and have things their own way for a time, selecting to suit themselves and in opposition to the usual master motives. Then follow regrets and sense of failure and an attempt to fortify the master motives against the time when the contrary tendencies shall again seek to assert themselves. There is perhaps no royal road to complete integration of the personality, but some wisdom can be gleaned from the fact that the master motives are not mere abstract selective and controlling agencies, but are interests with

definite content. To strengthen a motive is then to become more interested in the objects towards which that motive is directed. For example: to master the tendencies to irritation that often disturb family life, the best hint is to become interested in the other side of the case, to look at the matters that are likely to be in dispute from the point of view of the other party. You will experience a certain inner resistance when you attempt to do this. There is a sense of humiliation and de-personalization in attempting to take another's point of view, arising from the fact that one's personality is shaped largely by antithesis with other persons. We 'thank God that we are not as other men are'. But getting interested in another person's interests may mean the expansion of one's own personality, and the acquisition of master motives suited to act as selective agencies in the life of a group of persons.

VI

THE FACTOR OF ORIGINALITY

A dynamic psychology that confined its attention to instinctive and habitual processes, even with due emphasis on the selective factor, would not get beyond the more routine sort of behavior and mental work, and would create the suspicion of being a very one-sided affair. Certainly, if we are to understand the workings of the mind, we must understand the workings of those who distinctly possess minds: the Shakespeares and Newtons and Beethovens and Napoleons—the original geniuses in different fields of human activity. Invention, discovery, artistic creation, independent thinking and acting are considered to be the special marks of mentality; it is imperative, accordingly, that we should here make some attempt to understand them.

The great achievements of genius can only be examined from afar, since it is unlikely that a great creative act will ever come directly under the eye of the psychologist. Even if a genius should turn psychologist, he would find it difficult to come to close quarters with his great moments; since at such moments he would be carried away by the current of his thoughts, and not disposed to stop for a psychological observation. Real acts of genius would be as difficult as possible to introspect. So at least one imagines from the intense absorption that seems to be characteristic of really creative activity. Newton boiling his watch instead of the egg

brought him for lunch, Gauss so absorbed in his mathematics for many hours at a stretch that even serious personal news could not attract his attention—whether or not these incidents are authentic—may fairly be taken as characteristic of the state of mind of highly original production. Another characteristic, often verified in writers and composers, is an amazing speed of action at times of creative production. It may take a long time to get started, but, once in swing, production goes forward rapidly. Another noteworthy trait of the great genius is the quantity of his production: almost every really great painter, or composer, or writer, or discoverer, or inventor, has produced a surprising number of works. Such industry points to the presence of a strong drive.

Another thing worth noting is that each genius has his own special line of production. Some have been productive in two related lines, as painting and sculpture, or even generalship and government, or physics and mathematics. Sometimes a genius productive in one line has produced interesting, though not really important, works in quite a different line—Goethe's theory of colors, Cæsar's works on grammar. It is really not a little remarkable that the great men of the earth are noted each for one, or at most two closely related sorts of achievement. It may mean the specialization of native gifts. Probably it does mean that in part; probably Shakespeare could not have written Bacon's works, nor Bacon Shakespeare's, because their natural gifts lay in different directions. Yet the original genius often shows originality in more than one field, and the reason why he does not reach a high level of

production in more than one is largely lack of time. One may, as a tyro, be original in attitude, but not in accomplishment. One needs to appropriate the materials already present in a science or art before being able to make significant additions to it. This is easily illustrated by the history of any science or art. Great artists seldom occur sporadically. What we find in the history of art—as in the case of Greek drama, or of Gothic architecture, or of modern music—is a development from crude and simple beginnings to ever greater complexity, richness, and refinement, each creative artist basing his work on that which immediately precedes him, till, it would seem, a limit is reached, and interest turns to some new style or new form of art. In science and invention, it is even more obvious that, however original a mind may be, it works out from the assimilated achievements of its predecessors.

Another fact that stands out in the biographies of great geniuses is their early age at the time of their greatest originality. Alexander had finished his marvellous career at the age of thirty-three. Cæsar, after a successful career as a politician, struck out as a military genius at the exceptionally advanced age of forty. Napoleon became chief of the French armies at twenty-seven, and fought his most successful campaigns within the next ten years. Newton published his *New Theory of Light and Colors*, one of his most original works, at the age of thirty. Helmholtz's greatest work began to appear in print when he was thirty-five. Beethoven's *Third Symphony* was composed when he was thirty-four, and his *Fifth* when he was thirty-six. Shakespeare began producing his plays at about twenty-seven,

reached the level of *Romeo and Juliet* at thirty, *Julius Cæsar* at thirty-five, *Hamlet* at thirty-seven, and had written nearly all by the time he was forty. Darwin's great idea took shape in his mind when he was about twenty-five, though he devoted twenty years to establishing it before giving it to the public. These cases are not exceptional in the early age of their great ideas. We are prone to think of great men as oldish men, because the portraits of them were usually made after their fame had become assured; but portraits of them at the time of their greatest originality would show young men, men old enough to have assimilated the work of their predecessors, but not so old as to have lost the ardor and flexibility of youth.

If there is any other fact to be observed in a distant view of genius, it is perhaps a remarkable keenness of perception in the field peculiar to any individual genius. Newton's discovery of gravitation—whether or not the incident of the falling apple ever occurred—amounted to the perception of an element of falling in the motion of the moon around the earth. The moon does not *seem* to fall towards the earth, for it always remains the same distance away. On the other hand, its inertia should carry it forward in a straight line, and its deviation from that line towards the earth is a sort of falling, and was recognized by Newton to be a special case of falling. Probably all original discoveries can be similarly stated as acts of keen perception. If you will re-read Cæsar's *Commentaries* with the object of getting some insight into his genius, you will be struck by the frequency with which the statement is made that 'Cæsar observed' this or that—what he observed being, indeed, the key to

the situation, and enabling him to master it. Napoleon, according to his own testimony, habitually went into battle without a fixed plan, trusting to the course of events to bring about a situation which, instantly perceived and utilized by him, would bring victory. The merit of a painter or of a poet is, often at least, his keen eye for form or color, or for the pathos or dramatic quality of a situation.

Attempts to find the essential mark of genius in 'an infinite capacity for taking pains', in 'complete objectivity' as opposed to self-seeking (Schopenhauer), in 'love of truth' (Goethe), in the 'faculty of perceiving in an unhabitual way' (William James), err in the universality of the genius which they thus seem to presuppose. Genius is this—at least this: native capacity of a very high order for perceiving and handling a certain class of objects, the class differing with the particular bent of the individual's genius. The genius's spontaneous interest in this class of objects, his quick and penetrating apprehension of them, his masterful handling of them, his absorption in them to the neglect often of the commoner interests of life, his remarkable persistence and industry in dealing with them, and his consequent productivity, are all the same trait under different names. Continued attention to a thing means that something is found in it, interest in a thing means ability to apprehend it, mastery of a thing means understanding of it, absorption means interest and means that headway is being made, industry, of the type seen in the genius, means an interest in the thing for its own sake, means apprehension and mastery of the thing. The drive behind the industry of the genius is not the drive of

hunger, or sex, or rivalry—though any of these may contribute incentive—but is to be sought within the activity itself. The genius, in short, is an individual peculiarly adapted and responsive to certain aspects of reality. Contact with them arouses his responsive activity; he responds to them as naturally as the lion responds to the presence of prey. We have here, in other words, simply a clear case of the principle insisted upon in an earlier discussion of native capacities: that, namely, perceptual tendencies do not require a drive outside themselves, each being capable of furnishing drive for itself, even as instinctive hunting furnishes its own drive. The child is primarily interested in things, not for their practical value, *i. e.*, as means to ulterior ends, but in each thing for itself. The child is curious and playful. He is interested in a thing because he has a response for it. The genius, having this capacity for dealing with some class of objects present in him to an unusual degree, is able to remain for an exceptionally long time curious about this class of objects and playful with them. The genius's activity, as has often been observed, though strenuous and painstaking, is rather play than work—which means that it is carried forward by its own inherent interest rather than by a drive from beyond itself.

Leaving now the genius with his great originality, let us turn to the ordinary man, and even to the animal, and ask whether the factor of originality is at all operative in his behavior. Recalling our earlier consideration of the process of learning, we see that originality is not absent from any animal that learns, since learning produces new mechanisms, not provided by nature or pre-

vious learning. At the moment of learning a new reaction, therefore, there is present a factor of originality. Something new is achieved. The newness of the learned reaction may consist simply in the attachment of an old act to a new stimulus, *i. e.*, to a stimulus that has not previously had the power of arousing this act. Even the conditioned reflex, and negative adaptation, accordingly, have an element of originality in them. The newness may also consist in the combination of acts into a new compound act, as seen especially in the acquisition of motor skill in typewriting and telegraphy. Again, the newness may consist in a specific responsiveness to some feature of a situation which previously did not act in isolation to arouse response, but only in combination. Here originality takes the form of analysis, as in the preceding case it took the form of synthesis.

The originality here revealed is subject to certain limitations. Though it adds to native equipment, it does not absolutely go beyond nature, for evidently nature provided the possibility of the new reaction. Native equipment is provided by nature ready made; but acquired equipment is provided in the form of a capacity for learning. Again, originality does not take us absolutely beyond the bounds of the world as it is presented to us. We learn new adjustments to the world, we learn to perceive reality in certain particulars, and to manipulate it in certain ways. Just as even the dynamo and the telephone use the materials and forces of nature and are, in spite of their artificiality, after all natural objects and their actions natural processes, so the inventive act that originated them was a natural process and an adjustment to the natural world. You

can trace your ability to perform a certain skilled act back to the time when you learned it, and your learning of the act may properly be called the origin of that ability in you; but it is not an absolute origin, since it was, on the one side, an unfolding of your native tendencies and capacities, and on the other, a response to environmental conditions. It was, in short, an interaction between you and the environment, and gave a new adjustment of your nature to nature outside. Even the originality of the genius is not absolute.

If learning were purely passive or receptive, as it has often been conceived, novelties would still arise in the experience of the individual, but he would be so little concerned in originating them that we could scarcely speak of a factor of originality as operative in him. The fact is, however, that learning is a reactive process, and that what is learned is the reaction that one has given birth to. This is obviously so in learning a motor act, for we do not receive the act, do not have it impressed upon us, but make it in response to the stimulus acting on us, and by making it learn it. In perception and the learning of facts, the active role of the learner is less obvious; and, in fact, it was from considering this case to the exclusion of motor learning that philosophers were led to conceive of learning as a purely receptive process. But, in truth, perception is as much a reaction as is motor response. This is well seen in the cases, mentioned in a previous connection, of alternative percepts aroused by the same stimulus. Ambiguous figures give this varied perceptual reaction in an especially striking form, but any perception of an object that is not perfectly familiar or clear gives the same phenom-

enon of varied reaction, and the shifting of attention from one to another feature of a complex presented situation is varied reaction again. Thus, perception is entitled to be called reaction, and originality enters whenever a new perception is achieved, and a new idea gained, as truly as when a new motor act is added to our equipment. Ideas are not delivered to us ready-made by our teachers, but are modes of response which we have to develop for ourselves. Newton, the original genius, comes unaided to see the revolution of the moon as a falling toward the earth; he then points out to his contemporaries the elements in the situation that have led him to this way of perceiving; and his contemporaries, thus guided, begin to perceive the matter in the same way. It is as when on shipboard one person spies a distant sail and points it out to his fellow passengers, who, thus assisted, are able to see it for themselves. The factor of originality enters more largely into the performance of the discoverer, but is present to some degree in every one who is able, even with assistance, to break away from established modes of response and adopt new ones.

The ordinary man, followed through his day's routine, reveals little originality. Surrounded for the most part by familiar objects, he perceives them in the old ways or neglects them as he is wont. He meets the regular demands made on him by the regular acts that he has learned to make. Even if the objects that confront him are somewhat novel, he assimilates them to familiar types of object, and makes little response to their novelty; and even if the conditions he has to meet are somewhat new, he comes through, as best he may, with

his old stock of reactions. The inertia of habit carries him along; and as he has become pretty well adapted to his circumstances, habit carries him along pretty smoothly. Yet some embers of originality are still smouldering within him and can be fanned into life when conditions are right. If we ask what are the conditions favorable to arousing the factor of originality, we find a long-accepted answer in the maxim, 'Necessity is the mother of invention'. 'Invention', broadly interpreted, covers all forms of original behavior. The idea is that routine is the line of least resistance, departed from only under the spur of necessity. Necessity, to revert to our favorite mode of expression, furnishes the drive for original activity. Let us examine this maxim regarded as a law of dynamic psychology.

We should not expect to find more than a half truth in a proverb; and so it is in this case. The necessity must not be too extreme, too dire, for, if it is, no free play is allowed, and the old reactions simply have to be employed. Under dire necessity, one rather reverts to instinct than progresses to invention. Invention usually requires a degree of leisure and freedom from immediate danger or want.

Again, the necessity that gives birth to invention is not ordinarily a purely external necessity. Perhaps there is no purely external necessity in any case, for unless a man had the will to live, unless he had needs and tendencies within himself, external compulsion or deprivation would be indifferent to him. The necessity which drives a man is primarily his own need or tendency; and the external element in necessity consists in an obstruction to this inner tendency. It is when the

drive toward some consummatory reaction has been awakened in a man or animal, but progress toward the consummation is obstructed—while, nevertheless, a certain leeway is afforded for exploration and trial and error—that the conditions for originative behavior are realized.

The tendency that furnishes the drive for originative behavior—which, as already suggested, emphatically needs a drive, since it runs counter to the ease of routine—must, according to some authors, be furnished by some one of the great primal instincts common to man and animals. Danger, hunger as the type of economic need, rivalry, and the sex impulse, have most often been assigned as the motive force, and any of them may certainly furnish the drive. But there is no reason for thus limiting the possibilities. The motive force may be one of those added to the native stock in the experience of the individual; and, as the genius has shown us, it may be an objective interest. It is impossible to believe that Gauss, so absorbed in his mathematical discoveries as to be oblivious to hunger and the appeals of his friends, is driven by hunger, rivalry, or the sex impulse, or, in fact, by anything but his interest in what he is doing; and the same is true in an humbler way of the devoted labors of lesser men. This point has already been sufficiently insisted upon. The drive may be any tendency to action which, once aroused and not immediately satisfied, continues awake and so in a position to supply impetus to other mechanisms. Any drive, obstructed, may give rise to originative activity.

The conditions that excite original activity are, then, an awakened tendency toward some result and an ob-

struction encountered. If we would know the form of activity by which the obstruction is overcome, and the factor of originality revealed in action, we shall have to examine such comparatively humble instances as can be brought under experimental control, hoping that our results here will be applicable also to the higher manifestations of originality; for it is quite possible that the form of the process is the same in humble and noble instances, the difference lying in the field of exercise rather than in the form of the activity.

Experiments have been conducted in solving problems that were difficult enough to be genuine problems, without being so profound as to require a long time for their solution. The choice of problems has been dictated by the desire to get objective measures of success in solving the problem and at the same time reliable introspections regarding the mental process that led to the solution. Problems requiring some direct motor action are indicated, since both introspection and objective measurement are easier here than when the action required is purely ideational; but studies made with the latter sort of problem have led to the same sort of conclusions.

Ruger[1] chose mechanical puzzles as problems to be solved. The puzzle, unfamiliar to the subject, was placed in his hands with instructions to solve it, no other assistance being given, unless perhaps the assurance that the puzzle could be solved. The situation confronting the human subject in this experiment was quite analogous to that confronting the animal in a puzzle box. The puzzle set the human subject is simply

[1] *The Psychology of Efficiency*, 1910.

more difficult, to correspond with his greater ability. The reaction of the human subject was, in many instances, surprisingly like that of the animal. He resorted at once to manipulation, twisting the puzzle this way and that, examining this or that part of it, and following the suggestions offered by the part examined. When the first reaction resulted in a check, some other line of attack was substituted; and thus the subject went from one attempt to another, exemplifying as well as an animal could the principles of varied reaction and of trial and error. In the course of these varied attempts, the solution would be reached, often so unexpectedly as to surprise the performer, who perhaps did not see at all how he had escaped from the difficulty; and on a second trial his behavior might be much the same as at first; but, as in the case of the animal, the useless reactions tended to be eliminated gradually in a series of trials, and the movements that gave success retained, so that the correct reaction was more and more quickly performed.

Usually there was more of an intelligent process than this. The subject, on his first accidental solution, might at least observe where he was when success was reached, and confine his future efforts to this place, thus materially shortening the time of subsequent trials. He might also satisfy himself that such and such promising leads led nowhere, and consciously eliminate them. He might see into the mechanism to a greater or less degree. In some cases, indeed, he might gain a fairly complete insight into its working, and so reach an intelligent conception of the problem and of the method of solution. The more he 'saw into' the thing, the more he was able

to utilize his experience in subsequently dealing with another puzzle having in part the same principle. The more blind and empirical his procedure, the more likely he was to meet later with unexpected difficulties, and to have to begin over again after mastery had apparently been gained.

Occasionally a subject showed less tendency to motor activity, and was inclined to study the puzzle out by examining it, and to apply known principles derived from past experience. Though this mode of attack possessed advantages, it was usually not so well adapted to rapid progress as a procedure in which some manipulation was present. The procedure most to be recommended in the interests of prompt solution of a puzzle of this sort is to manipulate while keeping the eyes open for clews and principles. In the great majority of cases, definite advances in mastery, as shown objectively by sudden increase of speed in solution, were introspectively accompanied by fresh insight into the principle or workings of the puzzle.

Almost always, in such situations, the subject promptly reached some tentative conception of the nature of the problem—some assumption regarding it, and based his manipulations on this assumption. He assumed, for example, on the strength of the way the puzzle first looked to him, that it was to be solved in about such and such a way, and confined his efforts within the limits so drawn, being blind, often, to other possibilities which lay outside the scope of his first assumption. Amusing instances occurred in which, the assumption being a mistaken one, very obvious ways out of the difficulty were overlooked, as if the subject

were entirely blind to them. Under these circumstances, a suggestion by the experimenter that the subject formulate his underlying assumptions and then ask himself what other assumptions might possibly be made, sometimes led to the disappearance of this blindness, and so to a speedy solution after long and fruitless efforts. In some cases, however, the subject was unaccountably stubborn in his assumptions, and practically refused to alter them even though they had led to nothing but failure. This stubbornness and lack of flexibility is evidently the opposite of originality. It amounted to a sticking in the ruts, a following of the habit first established, a shutting up of the mind against any further insight. Though such stubbornness seems at first unaccountable, it noticeably gave the subject some comfort in spite of the resulting failure. This was undoubtedly the comfort of the familiar, the ease and smoothness of habit. Just as old people often dislike new ways, even when they recognize their superiority to the old ways, because the old ways are easy and comfortable, and any adventure outside of them brings an uncomfortable sense of insecurity, so it was here, and to some degree with all persons, though much more with some than with others. As indicated by these experiments, then, one condition of original behavior lies in a readiness to give up existing conceptions and venture out into the untried sea of further possibilities.

Though it certainly is not possible to give rules that shall make one who follows them original, yet these experiments suggested certain guiding principles that would probably increase the effectiveness of the factor of originality. One of these is that just indicated—to

endeavor to keep an open mind to possibilities that have not yet suggested themselves. This can sometimes be accomplished by first noting precisely what the assumptions are on which one is proceeding, and then asking whether other possibilities do not exist. Originality requires that the reaction to a problem should not be allowed to harden prematurely into habit.

Another teaching, a counterfoil to the preceding, is to test your assumptions one by one, and endeavor to exclude some of them definitely before passing on, and thus limit the field of operations. If some individuals fail for lack of flexibility, others are too flexible, are very open to clews and suggestions, but make little progress because none of the clews is persistently followed up. In other words, persistence may be in excess and amount to stubbornness, or in deficiency and amount to lack of control.

The value of generalization and precise formulation of what has been discovered also came out in these experiments, especially when transition was made from one puzzle to another. A generalized and formulated observation was applicable beyond the field where it was originally made, while others were likely to be limited to that field.

In general, then, the process gone through in original activity has the form of varied reaction and trial and error, with some degree of control and generalization. The process may be restated thus: the individual is confronted by a situation to which he attempts to react but meets with obstruction. This stimulates him to exploration and varied attempts at escape. The situation, being complex, offers many points of attack, many fea-

tures which, being observed, suggest or evoke reactions in accordance with past experience. The difficulty is, to find the right feature to react to, or, in other words, so to perceive the situation as to be able to bring our existing equipment into successful use. The individual whose past experience has best equipped him for reaction to this type of situation, who has most flexibility combined with due persistence and control, and who is natively most responsive to this type of situation, displays the most originality in dealing with it.

Another experiment, of a somewhat different sort, may also be reviewed for evidence on the matter of originality. In learning to typewrite, Book found, as has already been said in speaking of the process of learning, that after the learner had mastered the reactions to the separate letters, there came a time when he began to make synthetic reactions to often-recurring words or groups of letters. He hit upon this new and more efficient mode of reaction not deliberately, but without forethought, and, as it were, accidentally, when he was feeling fresh and in good physical condition, and was hopefully doing his utmost to improve his speed. He then found himself writing a word as a unit, by a concatenated series of movements called out as a whole, instead of by his previous method of spelling the word out letter by letter. The essential act seems here to be a widening of the mental grasp to take in several letters at a time, with their sequence and the relations of one to the other. For example, the first letter is written with the left hand, the second with the right, and the third with the left again. In the letter-reaction stage, the subject has taken no note of this alternation of the

two hands, but now, widening his span of apprehension, he takes in the three letters at once, with the alternation of the two hands as an integral part of the coordinated act. Very often, indeed, originality consists in perceiving or responding to the *relations* of things previously perceived without regard to their relations.

When we turn from these motor performances to ideational thinking and reasoning, we should perhaps expect to find the form of action entirely different. Trial and error, especially, is usually conceived as a low grade of reaction, appropriate to animals, but contrasted with the rational thought of man. Reasoning, as pictured in the syllogism, with its major and minor premises and resulting conclusion, appears truly as a straight ahead movement, very different from the tentative exploration of trial and error. But it is now recognized that the formal syllogism is by no means a psychological picture. It is a check which can be applied to a completed act of reasoning, to detect possible errors. If the reasoning is coherent, it should be expressible in syllogistic form, or some other definite form. But the process of reasoning, as it actually goes on, does not have the well-ordered form of the syllogism. It does not start with the major premise, but with a problem. The premises are not given, but must be found; and the finding of them is a tentative, trial and error process, though carried on, it may be, in the ideational rather than in the motor sphere.

This can easily be demonstrated by the solution of what are called 'originals' in the teaching of geometry. It is true that the regular propositions in the geometry books are set down in syllogistic form, with an orderly

procedure from the known to the unknown. But it is safe to say that these same propositions did not originate in this well-ordered form; and this can be demonstrated, or at least made highly probable, by observing how an 'original' is solved. One cannot go straight forward in an orderly manner—if one could, not originality but habit would be in play. One starts with the problem, and explores about, like a rat in a maze or a cat in a cage, trying this and that as one notices one after another feature of the problem, till finally a good clew is got, the essential elements of the problem are discovered and the appropriate premises recalled—after which trial and error process, indeed, one can remodel the reasoning into the syllogistic form and thus check up its correctness. Reason thus proceeds from the unknown to the known. It would be easy, no doubt, to start with the known, but the question would then be, whither to proceed. We need a goal. The goal is the unknown, which comes first in reasoning, as a goal, to be sure. Reasoning is first of all a tendency towards the unknown, and next a finding of something known from which to proceed. The unknown, strange, baffling situation must somehow be made to yield something that is known, by means of which the unknown can be mastered.

The qualifications for a good thinker are, first, that he should be equipped by past experience for dealing with the kind of material now presented; that he should, in other words, be in possession of knowledge applicable to the problem in hand. Second, that he should have a keenness in observing the features of the situation or problem presented to him, and a degree of 'sagacity'[1]

[1] See the Chapter on 'Reasoning' in James's *Principles of Psychology*.

in selecting or hitting upon features that are of significance; this quality distinguishes the effective thinker from one who, perhaps with great learning, labors long and ineffectively over inessentials. Third, he should have a quality of mind which we may call flexibility, an ability to get out of the rut and see what did not at first impress him. Fourth, he needs the power of control, so that his thinking, instead of wandering hither and yon as interesting suggestions strike him, shall remain fixed on the problem in hand in spite of the flexibility of his attention. Of these qualifications, that which is most amenable to improvement through effort and training is evidently the first, while that which is most exclusively a matter of native gifts is probably the factor of sagacity. To find a clue is some merit; to be able to drop one clue and find others is still better; but to have the 'detective instinct' that fixes on the right clue is the mark, in any given field, of the man who has a real gift for original thinking in that field.

The conditions under which reasoning arises—obstruction to a tendency which has been aroused to activity—give rise also to another important phenomenon. The obstruction arouses an access of energy in the tendency obstructed. Access of energy on obstruction seems a fundamental characteristic of instinctive, as indeed, of any action. Restraint of an animal that is starting to move makes him strain against the restraint. Holding your hand over a child's mouth when he is crying makes him bawl the louder. The horse responds to the rise in the road, or to the increase in his load by pulling the harder—up to a certain limit, of course.

This tendency can be experimentally demonstrated in adults. The muscular force of a movement is roughly proportioned to the resistance encountered, and if the resistance is suddenly increased, there is a reflex increase of muscular energy to overcome the resistance. And the same thing can be observed in acts that are not distinctly muscular.[1] The subject rouses himself to overcome a distraction or a difficulty in the task before him, and often does better work under difficulties than when everything is 'plain sailing'. Even where the resistance encountered is not of a directly physical nature, and where muscular force has nothing to do with overcoming it, an almost universal result of encountering resistance is an increase in motor tension and action. Distraction while one is typewriting causes one to pound the keys harder and speak the words aloud; and the same is true when the beginner is encountering the difficulties incident to his unfamiliarity with the work. This overflow of energy into motor channels reveals the access of energy that has occurred in the brain as the result of the difficulties encountered.

There may also appear signs of displeasure and especially of anger. The subject's face becomes flushed, his voice takes on a harsh quality; he may give vent to interjections expressive of vexation. If his introspections are taken, he testifies to the presence of displeasure and vexation, and of determination to overcome the obstacle and reach the desired end. He is likely to express himself by saying, "In spite of the difficulties, I can and will do this thing."[2] The state of mind is one of zeal and

[1] Morgan, *The Overcoming of Distraction and Other Resistances*, 1916.
[2] See Ach, *Über das Willensakt und das Temperament*, 1910.

even of fierceness; and it is not at all improbable that the internal bodily condition is similar to that which Cannon has shown to exist in rage.[1] Anger, zeal, determination, willing are closely allied and probably identical in part. Certainly they are aroused by the same stimulus, namely, by obstruction encountered in the pursuit of some end.

It is interesting that reasoning, willing, and anger are all aroused by the same sort of conditions. Willing and anger are, indeed, somewhat similar states, though will may certainly be strong and at the same time comparatively calm. Anger and reasoning are not likely to be aroused together, but some degree of voluntary effort is aroused along with reasoning. The tendency of anger, or of will for that matter, is to overcome the obstacle by a frontal attack, whereas the tendency of reason is to explore about for some other way to the desired goal. The strong will, that bends not to any opposition, appears the nobler trait, and Achilles a greater hero than the wily Ulysses; though it is perhaps Ulysses that more often takes the city. No complete antagonism, however, exists between the two; for a certain amount of voluntary energy is needed to carry the reasoning process forward.

Reasoning is the development of a new mechanism; willing the development of fresh motive power. The most important question regarding willing is: Whence comes this fresh motive power? How can obstruction to a tendency increase its drive? Apparently there are several ways in which the extra drive can originate. In the simplest cases, no new tendency is

[1] *cf.* pp. 52–55 above.

aroused, but the tendency that is already somewhat active is more completely aroused by the obstruction. The avoiding or self-protective instinct, for example, is aroused by the presence of danger, but it may be only moderately aroused if escape is unimpeded; but let an obstacle obtrude itself, and the fear impulse is more thoroughly awakened and gives greater energy to the escape movements.

Slightly more complex is the case where the primary tendency, after starting a series of acts in motion, has itself gone partially to sleep, because the interest of these acts—preparatory reactions—is sufficient to carry them forward once they are started. They supply their own drive. But now let an obstruction occur, and the primary tendency is again awakened and supplements the drive inherent in the act that is momentarily being executed. I start for the train, it may be, in plenty of time; and, while this primary motive of catching the train is sufficiently awake to keep me to my course, I am carried forward from moment to moment by habit or by the interest of my walk and of the things I see. But an obstruction appears, and the primary tendency awakes to full activity as I remember that I must catch that train.

Still more complex cases occur, in which some motive, not concerned in the course of the activity up to the moment of obstruction, is then aroused and adds its force to the force of the motive already in action. I may have started for the train without any further motive than that it is my routine to take it. But when an obstruction threatens to prevent my catching it, I may remember that on this particular day I have an im-

portant engagement which will be missed if I fail to catch this train; and this additional motive lends increased energy to my efforts. Or, my self-esteem may be touched, since it would be humiliating to miss the train. Or again, my ideal of myself as one who can be depended upon to meet his engagements may awake; and some of the deepest forces in my personality may thus be drawn into an action that was at first quite superficial in its motivation.

The obstructions thus far spoken of have been external to the individual; but this is not true of all, and in fact some of the most serious will problems arise from inner obstruction, from the conflict of two tendencies. If the tendencies are about equally balanced, the conflict is vexatious while it lasts, and it is very apt to end in an unsatisfactory way, one tendency getting the advantage, while the other, not entirely quieted down, remains to upset the equilibrium. The conflict is sometimes resolved by a rational process effecting a coordination between the opposing tendencies and making possible the satisfaction of both in some inclusive activity. Sometimes, again, one tendency is subordinated to the other, or it may be put off and quieted by the promise that its turn will come later. One who has difficulty in getting up in the morning may manage it by promising himself that he will go back to bed after breakfast—probably forgetting the promise when once thoroughly awake. But sometimes a tendency refuses to be put off or subordinated or coordinated; it must either prevail or be suppressed. Even such conflicts are sometimes resolved, and one of two irreconcilable tendencies made to yield to the other. This probably can only be ac-

complished by the coming into action of some drive other than the two at first in conflict and throwing its force on one side or the other. Thus far-reaching plans of life or personal ideals may be drawn into the conflict and administer a check to an injudicious or unworthy tendency which is momentarily insistent.

Freedom of the will is a topic now generally relegated to philosophy. In the sense of being uncaused and unconditioned, freedom is certainly an uncongenial concept to dynamic psychology, whose aim it is to seek for causes. We may, perhaps, speak of the will as free in somewhat the same sense as we call reasoning original. Obstruction is overcome in the one case as in the other. Internal sources of energy are tapped, and in overcoming external obstructions the individual reveals his independence, as in resolving inner conflict he may reveal the independence of his higher or more inclusive self as against tendencies less closely integrated with the self. As reasoning makes a new use of inner resources, so willing gets hold in a new way of the inner driving forces of the individual. As the originality of reasoning is limited in that it cannot pass the bounds of one's inner capacities nor the bounds of the real world, so the freedom of the will, it would seem, is limited to the forces inherent in the individual's nature, as its effectiveness is limited by the general forces of nature of which the individual is a part.

VII

DRIVE AND MECHANISM IN ABNORMAL BEHAVIOR

In an earlier lecture, when the course of the modern movement in psychology was being traced, interest in abnormal mental conditions was mentioned as one of the streams that have contributed in an important way to the general movement. The modern tendency has been to get away from the speculative consideration of mental affairs, and to follow the lead of the other sciences in basing conclusions upon observed and recorded facts. Abnormal mental conditions offer a great mass of facts for observation, and the need of taking account of these facts, in any adequate treatment of mental life, has been one of the forces driving psychology to the scientific attitude. When this mass of facts first began to be presented to the consideration of psychologists, they were inclined to reject it as something lying outside their proper sphere. Psychology, they asserted, was concerned with the normal workings of the mind, and had best keep itself clear of the abnormal, lest it become confused by what are certainly very puzzling phenomena, and, in trying to embrace the abnormal in its view, fail to get a clear vision of either normal or abnormal. But this attitude of opposition could not be maintained in the face of the enormous accumulation of data resulting from the ever-increasing study of abnormal mentality by the physician.

The primary interest in mental disorders was the practical desire to ameliorate the condition of the sufferer, and the observations in this field were accordingly made by that fraction of the medical profession that devoted itself to the specialty of nervous and mental diseases. That was true at the beginning, and is true in the main today, though we find a certain number of professed psychologists taking a hand in the direct study of abnormal mental conditions. In the main, pathological psychology has developed rather independently of general psychology, and has made only a perfunctory use of it. The psychiatrists have adopted some of its phraseology, and endeavored to classify abnormal mental conditions under psychological headings, but they have, as a whole, remained surprisingly out of touch with what was being accomplished by the students of normal psychology. Perhaps it would be fairer to say that they found little to their purpose in the text books of normal psychology, and so, after making it a bow of recognition, went about their own business in their own way. On their side, the professed psychologists have usually felt themselves rather out of touch with psychopathology. They have recognized the great mass of facts accumulated on the subject of abnormal mentality, but have not themselves had a direct enough knowledge of those facts to warrant their attempting to systematize them, while they have regarded with some scepticism the generalizations and theories of physicians regarding the psychology of abnormal conditions. It is time, without doubt, that these two lines of psychological investigation came more completely into touch with each other. The difficulty is for either party to find

the time to make a first-hand acquaintance with the materials in the possession of the other—for the psychologist to find time to make a serious study of insane and neurotic individuals, and for the psychiatrist to find time to work in the psychological laboratory. Meanwhile, the psychologist cannot remain indifferent to the facts presented by the psychopathologist. There is much there that aids in understanding normal mental life. Especially, there is much there bearing on the important question of the drives or motive forces operative in all mental life, normal or abnormal. Thus far, experimental psychology has done much more with mechanisms than with drives, while the most significant findings of psychopathology have been concerned with drives rather than mechanisms. The two thus serve as complements of each other.

Four sorts of mental abnormality offer themselves for study. The simplest case is that of mental defect, and the most complex is probably that of insanity. There are, besides, the conditions that go by the name of neuroses, and those that go by the name of the 'psychopathology of every-day life', *i. e.*, minor abnormalities occurring in normal individuals.

In mental defect, as the name implies, the abnormality consists almost or quite exclusively in a lack. The lack is one of intelligence, or at least shows itself in that way. According to the degree of deficiency of intelligence, the individual is classed as an idiot, an imbecile, or a moron, the last class consisting of those whose intelligence is not far below the level that might be called low normal. The moron or feeble-minded class shades off imperceptibly into the more stupid of the great class

of normal individuals, even as the little-gifted group of normal persons merges into the larger group of average intelligence and this in turn into the smaller group of superior gifts. The whole grouping is, indeed, artificial, with no sharp line anywhere. The mentally deficient individual differs only in a quantitative way from the normal. But a line has to be drawn for practical purposes, and the attempt is to draw it at such a point as to divide those who can make their own way in life from those who, left to themselves, cannot get along in the social environment, and accordingly need supervision in their own interest as well as in the interests of society as a whole. Society is concerned because mental deficiency is a strong factor in producing pauperism, crime and prostitution, industrial accidents, the spread of disease, and other forms of human misery, because mental deficiency is largely the result of heredity, and because the mentally deficient are prone to breed abundantly, and thus, at a time when the general birth rate tends to fall, to increase, generation after generation, the proportion of feeble-minded in the population and thus the amount of crime and misery. For these reasons, it is obviously incumbent upon society to provide public institutions or supervision for all the mentally deficient, with the object both of making their lives as happy as possible and of preventing them from damaging society by their own incompetency and by breeding and multiplying.

The psychology of mental defect seems to be fairly simple, though undoubtedly much remains to be discovered regarding it. As regards drives and mechanisms, the feeble-minded person is deficient in both.

It will be remembered that we have insisted all along that drives and mechanisms were not fundamentally different, but that a drive was itself a mechanism which, once aroused, persisted for a time in activity, and was able in turn to arouse other mechanisms. The feeble-minded person is deficient in mechanisms because he is unable to learn as much as a normal person. His equipment is therefore scanty and becomes scantier, for his age, as he grows up. In matter of equipment, he remains at the level of the child, or, better, at different levels of childhood according to the degree of his defect. However strongly he is driven, then, either from without or by his own motives, he simply cannot accomplish much, not having the mechanisms for accomplishing it. But he is lacking in motive force also. He is, in fact, notably lacking in such matters as a life plan or a social or family interest, which are so important as drives in the normal man. For lack of such internal drives, he is easily led astray by designing persons, and is, in large measure, a creature of the moment.

The other types of mental abnormality cannot be so simply conceived. They differ qualitatively rather than quantitatively from the normal. They are distortions and not mere defects in mentality. Here is a man, for example, who believes himself to be Alexander the Great, prevented from taking his true station in life by a combination of his enemies. No doubt such a delusion means weakness somewhere in the mental make-up of the subject; but weakness alone will not explain why the delusion takes a certain form. There is something positive about a delusion that depends on the activity of the subject, and not simply on his lack

of activity. When we attempt to trace the development of such a delusion in the individual's history, we very likely discover that he has always been rather a peculiar character, self-conceited and suspicious of other people, not by any means a 'good mixer'. His inability to get along with other people was the first sign of weakness in his make-up. His social perception was poor; he did not understand other people's actions readily and correctly. He pleased himself by interpretations of their behavior unfavorable to them but favorable to his high opinion of himself. They slighted him, as he conceived, because they were unwilling to recognize his superior qualities. He thus built up for himself a false conception of the social environment in which he moved, and got more and more out of touch with it. From isolated suspicions and misinterpretations, he grew into an organized system of suspicion and false interpretation. The most trivial actions were interpreted as significant of an attitude of hostility towards himself. A stranger coughing at an adjoining table in a restaurant might elicit the angry demand, "How dare you cough at me? I will not stay here to be insulted." If an acquaintance offered the least criticism, that was evidently an unfriendly act; if he made himself agreeable, that was simply to divert suspicion and conceal his unfriendliness. This system of suspicions was organized about an overweening self-conceit as its core. There was a great exaggeration of his own ability and importance, though as yet no definite delusion regarding his identity. Now let the subject overhear someone mentioning the name of Alexander the Great. In accordance with his system, he tends to believe that the

remark has some reference to him; and in accordance with his sense of his own importance, he is easily led to the conjecture that people are saying that he resembles Alexander the Great in appearance or ability or some other respect. As he ruminates over this significant remark, the idea flashes over him that he *is* Alexander the Great, and this grandiose idea gives him such satisfaction and so clarifies the whole mass of his suspicions, that he makes it his own, slurring over its improbabilities, and dwelling on whatever makes it seem possible. Now, at last, he understands why he is slighted and persecuted. He is this great personage, and more or less clearly known to be such by his associates, who, however, are naturally unwilling to exalt him so far above themselves, and therefore try to keep him down. Recalling the events of his past life in the light of this new insight, he finds a thousand incidents that point towards the great fact, and organizes the whole of his social experience around this delusion of his own great personality. He may still not have reached the point when he is ready to act upon his delusion or give open expression to it, and in rare cases he may carry the delusion concealed within him for years, but eventually his behavior is so affected by it that he is recognized as insane. This is the type of insanity called 'paranoia', rather an uncommon type, though similar delusions, less completely worked out, are frequent in other forms of insanity.

If we attempt to restate the behavior of the paranoiac in terms of dynamic psychology, we see, for one thing, that the delusion, once fully formed, becomes part of the learned equipment of the subject. He acquired it

by a long process of learning. Once formed, it acts as a drive, facilitating acts and perceptions that would otherwise be possible but not probable, and inhibiting others that would otherwise probably occur. The delusion acts as a permanent bias in interpreting the actions of other people. But there must have been some drive activating the process by which the delusion was acquired; this drive was undoubtedly the demand for social recognition, which can itself be traced back, in part, to the self-asserting or dominating instinct. We are tempted to conclude that it was because the demand for social recognition was more insistent in this individual than in other men that the delusion was generated; but such a conclusion overlooks the element of weakness in the paranoiac's make-up. From the beginning he showed a deficient power of understanding others and adapting himself to them; this weakness created obstacles to the gratification of his demand for social recognition, and it was in trying to overcome these obstacles that the suspicions, inordinate conceit, and delusions of persecution and of greatness were generated. The process of acquiring the delusion was in fact none other than our old friend, learning by trial and error. Like the cat in the cage, the incipient paranoiac faced a baffling situation. Demanding what we have briefly called social recognition, he was prevented by obstacles lying within himself, but not so understood by him, from reaching his goal. Varied exploratory reactions were the natural result, one of them being the interpretation of the indifference of others as dictated by their jealousy of his own superiority. So interpreted, the behavior of others became a form of

recognition; and thus the demand for social recognition was in a measure met. It was met still better by the delusion of greatness. Scarcely anything could more fully gratify self-conceit than the conviction that one was a very great person, temporarily prevented from taking one's rightful place in the world by a combination of ill-wishers, but destined, no doubt, to escape from this net of intrigue and to compel recognition. Thus, by delusion, the paranoiac escaped from his cage, and his escape, though unreal, was so satisfactory to him as to terminate the trial and error process, and remain as a fixed form of reaction to the social environment.

What happens in the delusions happens in various other types of abnormal behavior. We have to suspect, in each case, that there is some *drive* behind the development of the abnormal reaction. It will be fundamentally a normal drive, one that operates in all men. We have to suspect also an *obstruction* barring the way to the goal towards which the drive is directed, an obstruction internal to the individual and due to weakness in his make-up. Thus involved in a puzzling situation, he goes through a *trial and error* process, and, being unable because of his own weakness to find a really appropriate solution of the problem, adopts some *substitute* solution that gives an illusory success, and thus satisfies the drive and permits its tension to relax.

Besides this elaborate trial and error process, there are simpler processes leading to abnormal behavior. Some such behavior follows the type of the conditioned reflex, as was neatly shown in MacKensie's experiment on a hay fever patient.[1] A person subject to hay fever

[1] Cited by Morton Prince, *Journal of Abnormal Psychology*, 1908, III, 270.

brought on by the chemical influence of roses had a typical attack on being suddenly shown some roses made of paper. Evidently the sight of roses, from being constantly associated with their chemical effect, had acquired the power to produce the reaction. There are many instances of this general sort. Another fairly simple type is the habit neurosis, in which the abnormal reaction, having been for some reason made several times, has acquired the force of a habit. A habit is a drive, as we see from the tension and uneasiness that occur when a habitual reaction is called for but prevented from realizing itself. To perform a habitual action gives satisfaction; or, at least, to forego the performance brings dissatisfaction and uneasiness. This is seen in attempting to break such a habit as smoking. There may be little craving for the drug, but there is a craving for the habitual act, and a feeling of irritation when it is prevented from occurring. Such phenomena occur also in the neuroses. But a fully fledged neurosis is more complex than a conditioned reflex or habit, involving in its development a drive, an obstruction due to inherent weakness, and trial and error leading to some substitute for real mastery of the situation.

The substitute reaction is made possible by first substituting an unreal for the actual situation. Pierre Janet, one of the greatest of psychopathologists, has strongly insisted, as others have done after him, on this tendency of neurotics to neglect the real world about them—especially the world of people and daily duties—and to substitute for it a world 'molded to their heart's desire', an easier and simpler world. Not having the

force to deal with their real work, or with the real people about them, they remodel things by false interpretations, or leave real things altogether aside to immerse themselves in imaginary situations, from which the obstruction of their own weakness is left out, so that their desires can reach their goal. It is easy to be the hero in a day dream of your own construction, but to resort to this source of satisfaction in place of real deeds in the real world is a mark of weakness. This substitutive activity, carried to an extreme, is definitely abnormal and neurotic.

The neurotic individual is not counted as insane, because he is not definitely deluded or disoriented or inaccessible to rational dealings. Yet he may be incapacitated for work or normal happy living and social relations. He lives to too great an extent in an unreal world of his own construction. He has met his life problems by solutions that satisfy his tendencies in a measure, but still are unsatisfactory because they have left out of account essential factors in the real situation.

In the manifold variety of neuroses, two well-defined forms stand out, and are often regarded as types, the others being regarded as approximations to these, though this is quite possibly an erroneous way of conceiving the matter, since we generally find, in studying individual differences and peculiarities, that the well-defined 'types' are really extreme variations from the real type, which is the less peculiar and more average individual. The two 'types' are what are called hysteria and psychasthenia. They have in common a deficiency of mental energy, or, we might say, a deficiency of drive

or motive force. This deficiency is often called 'abulia' or lack of will.

The one type of neurotic individual, the hysteric, adjusts himself to his lack of motive force by narrowing the field of his activity, so remaining intense in a narrow field, dissociated or split off from the rest of his life, to which he becomes indifferent. Some system of thoughts, memories, emotions, and tendencies grips him at times with such hallucinatory vividness as to make him oblivious to his surroundings, while he lives in this system and acts it out, it may be, with surprising dramatic power. When he comes out of this trance or fit, he forgets all about it and its system of ideas, etc. The narrowness of his 'field of consciousness' renders him extremely suggestible, and liable to peculiar paralyses and losses of sensation.

The psychasthenic, on the contrary, is diffuse rather than narrow. He tries to keep hold of everything, but has not force enough to make anything go properly. He doubts, hesitates, repeats, ruminates, feels unreal and unsure of himself. On the basis of this abulia and insecurity there develop more or less well-defined irrational fears, ideas, and ways of acting, which are to be interpreted either as substitutes for significant acts which he has not the force to undertake, or as his ways of conceiving the difficulty in which he finds himself. It is more satisfactory to deal with a definite trouble than with an undefined feeling of strangeness and insecurity, and thus the queer fears and fixed ideas of these subjects afford them some satisfaction, and constitute a sort of way out of their difficulties. The tendency to escape from vague uncertainty into some sort of definite

conception of things is a real driving force in many situations in life. Substitute reactions can perhaps be understood as follows: the tendency towards a certain activity—perhaps the daily work—is aroused to some degree, but not sufficiently to produce actual performance, and the resulting state of tension is relieved by engaging in some other, easier activity, like pacing restlessly back and forth, repeatedly washing the hands instead of cleaning the house, worrying about things instead of doing them, vowing to punish oneself if one does not do one's task, and then ruminating over the question whether it is not a sin to make such vows. Following up this general line of interpretation, Janet has given a very interesting account of the numerous eccentricities of the psychasthenic's behavior. The substitute reaction is also, as already suggested, a 'way out', a solution of a problem by trial and error and without taking account of all the essential facts.

Milder symptoms of the same general sort occur in persons who would be classed as normal rather than neurotic. The substitute reaction is very common when a difficult task has to be performed, or an unpalatable truth to be digested. One who has a disagreeable duty to perform is apt to find good reasons for delay. It is not uncommon, for example, that writers, except under strong stimulus or when they have become well 'warmed up to it', find writing an irksome task. Such a one, sitting down to his desk or typewriter, will have all sorts of other things occur to him that he ought to attend to first. Or, he may run over in his mind what he means to write, and get two or three pages planned out almost word for word; but as soon as he makes a move to write,

the seriousness of actually committing it to paper gives him a check and he proceeds to think it over again, and soon finds himself once more two or three pages ahead. It seems to be much easier for him to think out what he is going to write after a while than to 'get right down' to writing. Another form of substitute reaction often appears in solving such a problem as that of 'making both ends meet'. Instead of sticking to the hard facts, one is apt to imagine something 'turning up' and relieving the whole difficulty, and this imaginary situation substituted for the real one may give quite a glow of satisfaction.

Traits that are scarcely other than abnormal often occur in the relations of one normal person with another. The cherishing of imaginary slights and grievances is a curious example. It certainly seems perverse to derive satisfaction from imagining oneself ill-treated; yet this is a common form of satisfaction. The subject pictures himself as the suffering hero in a way that reminds us of the delusions of persecution; and probably the explanation is much the same. There is an element of weakness lurking here, a doubt as to one's own competency as a friend or lover; and there is a sort of substitute reaction, in that refuge is sought in imagined grievances instead of frankly and directly doing some friendly or loverlike act.

Freud, one of the most influential psychopathologists of the day, has fixed his attention on quite another type of abnormality occurring in normal persons. This type is represented by the slip of the tongue, the lapse of memory, or the 'symptomatic act', which, done 'unintentionally', betrays some hidden or even unconscious

motive. Freud's reason for classing as abnormal so trivial a thing as a slip of the tongue is, first that it is a slip, but second, and more important, that he conceives it to be a disturbance produced by the 'unconscious', the source, also, according to his way of thinking, of all neurotic behavior.

His conception of the matter is about as follows. Suppress a tendency, forbid it to have its way, and you drive it from consciousness without eliminating it from your system. It remains as part of your 'unconscious'; it is partially aroused at times by appropriate stimuli, but sternly restrained by your dominating conscious self—not, however, without causing a passing disturbance in the activities of the conscious self. During sleep, the unconscious has a better chance, but even then cannot come out into the open, but has to disguise its illicit tendencies in the symbolism of dreams. Neurotic symptoms are analogous to these disturbances but more serious and persistent. By a process of 'psychoanalysis', in which the subject, under the guidance of the analyst, relaxes the restraint and allows the unconscious tendencies to show themselves openly, they are, after much patience, discovered and understood, with the happy result that they cease plaguing the subject. The suppressed tendencies that are thus brought to light are sexual in nature, and date back to early childhood, though the fundamental infantile tendencies are simply the nucleus of a host of particular sexual impulses that, having from time to time been repressed, people the underworld of the unconscious. What can be done with these tendencies, once they are recognized by the subject, is to 'sublimate' them, draining off their

motive force into other channels, thus allowing them an outlet satisfactory to the conscious self and doing away with the disturbances that they have previously caused in seeking an outlet.

The main points of the Freudian psychology—infantilism, the importance of sex impulses, and repression into the 'unconscious'—all have an element of truth, but are all over-emphasized to the neglect of other factors that should be included to give a true picture. As to infantilism: while there is no doubt a continuity in the individual's experience and tendencies from birth to adult life, new motive forces are developed, as we have tried to show in another chapter, and the new motives have force of their own and not simply force derived from the instincts. The sex tendencies of young children are much over-emphasized by Freud, being read into the behavior of children from the standpoint of an adult and not fairly inferred from the behavior of the child itself. The 'unconscious' is certainly overdrawn by Freud. Slips and lapses, as well as dreams, are due in the main to quite other causes than those which he gives them. And as to the sexual impulse, while this tendency is certainly influential in most individuals, it is only one among many tendencies that drive human activity. Freud formally admits, indeed, two motive forces, sex and the 'instinct of self-preservation', but our consideration of instinct revealed many more than two tendencies in native equipment, and the reality of learned or acquired drives must also be insisted on. The adult individual contains a multitude of drives, some more important than others, some dating from his native equipment, some developed from time to time on the

basis of native equipment, but having force of their own, once they are developed, and not needing to draw upon the motive force of the native tendencies. The Freudian treatment of drives is thus very far from adequate.

In practice, moreover, it is always the sex tendency that is emphasized by Freud and his followers. Wherever they are able to detect a sex tendency hidden in a certain activity, that settles the matter for them; the sex tendency is the real driving force and the other apparent motives are mere disguises of the sex tendency. They do not recognize the reality of 'mixed motives'. If the sex tendency is present, it is credited with doing the whole work.

There is an atmosphere of the mysterious about all this that renders the Freudian psychology at once rather fascinating and difficult to deal with on a strictly scientific basis. It is easy to 'shoo' the whole thing away as unscientific, and the line of evidence brought forward in support of it deserves this summary treatment, but it is not so easy to handle the questions raised by the Freudians so judiciously as to extract the truth in their teachings and leave aside the dross. In the case of 'mixed motives', for example, the question is how, in the interests of psychological progress, to deal with a man who, unearthing a sex impulse in a complex activity, straightway insists that this furnishes the whole driving force and all other apparent motives are shams. Perhaps a suitable way of meeting such a contention is to take behavior that is primarily and admittedly driven by the sex motive, and see whether other motives do not enter even here to modify behavior and give it more variety and interest.

Human sex behavior shows the presence of several other motives in addition to the genuine sex impulse.

Curiosity is, in youth, blended with the sex impulse in the first excursions into sex behavior, and in maturity as well the element of novelty in a sex stimulus gives it additional force. In fact, without novelty this impulse is often not arousable. Hence, infidelity and many peculiarities of sex behavior. The spirit of independence and rebellion against authority is also associated with the sex impulse, especially in youth. As in the case of curiosity, this accessory drive cannot be derived from the sex impulse, since it appears in many other ways and not simply with reference to sex. Clandestine love is especially attractive to youth, apparently because of the admixture of this motive of independence; love-making carried on under the noses of those who would object has an extra spice. Much of the sex behavior of young people can only be accounted for by taking into account the attractiveness of the novel and the forbidden. If the sex impulse alone were in action, the resulting behavior would be much more direct than it is. The essential illicitness of sex behavior is a curious pretense, kept up even between husband and wife in the interest of greater zest, and kept up even by those writers who, in theory, most emancipate themselves from the social restrictions on sex behavior, but who, in the practice of their art, needing to make sex matters interesting, invest them as much as possible with an atmosphere of illicitness and so add piquancy to their stories.

The protective impulses, as McDougall says, though most definitely aroused by the infant and therefore identified with the parental instinct, are aroused also

by other persons than children, when we can adopt a protective attitude towards them. It is very clear that a man likes to consider himself the protector of the woman he loves; and this is not simply the sex impulse, for that may be present with little or no impulse to protect, and indeed with a brutal disregard of the welfare of its object. But in the higher type of love, the element of protectiveness comes into play. The man likes to protect the woman, and she, too, likes to 'mother' him. In her case, indeed, the maternal or mothering instinct often plays the leading part in the early stages of love; while, in a happily mated pair, the protective motive, persisting in both parties, furnishes an important part of the drive behind their mutual interest and affection.

The instinctive tendencies of domination and submission are also linked with the sex impulse to produce the complex motive force which we call 'love'. Theirs is the satisfaction of ownership and the satisfaction of being owned. Desire, here as elsewhere, is stimulated by uncertainty of possession. Undisputed possession leads to 'negative adaptation' in respect to the sense of possession, and to consequent waning of desire, which can often be re-awakened by the revival of uncertainty as to possession. At the lowest level, the dominating tendency is satisfied by brute physical compulsion, at a higher stage willing submission is essential, and at a still higher stage recognition on the part of the loved object of one's own personal merits, as is evidenced by the sensitiveness of lovers to any fancied slight or criticism.

That the esthetic impulses are also closely associated with the sex impulse, is seen especially in the interest in

the personal beauty of the loved person. The sex impulse is undoubtedly in part the drive behind appreciation of beauty, as man is more appreciative of feminine and woman of manly beauty. Yet the sense for personal beauty cannot be wholly derived from the sex interest, since there is nothing in the latter to decide what is beautiful and what lacking in beauty in most parts of the body—the face, especially. Moreover, appreciation of beauty extends in some degree to one's own sex.

Art has been asserted by some would-be psychologists to be motived entirely by the sex interest; and the influence of this motive is indeed clearly present in painting and sculpture, as well as in literature. But, as in the case of personal beauty, the sex impulse does not seem capable of deciding what is beautiful, and, further, not all subjects of art can be related to the sex impulse—landscapes, for example.

Music, likewise, has been attributed to the sex motive, and its early association with dancing has been held to be a sufficient ground for this interpretation. But not all dancing, especially of primitive peoples, is related to sex, some of it being related to war or to other excitements—witness the child's dancing for excitement. Moreover, the sex motive can go but a very little way in explaining musical preferences and the development of music from its crude beginnings to the condition of a highly elaborated art. The truth is, here as in the other cases, that the esthetic impulse is not derived from the sex impulse, but exists independently and has become secondarily associated with it in certain cases; and the association is not entirely a spreading of the

sex drive into the esthetic sphere, but just as truly a spreading of the esthetic motive into the sphere of sex interests. Art has taken the sex motive into its service, but sex has equally taken the art motive into its service. When a man falls in love with a beautiful maiden, he is actuated not simply by the sex impulse, but also by interest in personal beauty. At its lowest stage, desire is unconcerned with any personal traits, even physical excellence being unnecessary, provided only the element of sex is present, but at a higher stage the esthetic impulse must also be satisfied, and excellence of disposition, and refinement of mind, besides physical beauty, may be demanded.

Why do young people like to dance? What motive drives them to abandon ease and comfort, and engage in so strenuous an activity? Sex, without doubt, furnishes a large share of the motive force, but if it were the sole motive, why should they trouble themselves to master definite steps, and keep time with the rhythm of the band, and why should there be any band, and, if possible, a good band? Surely part of the motive force is the love for rhythm and melody and harmony, while part is the love for well-ordered motor activity. Dancing is play, and part of its driving force is the same as that which makes children run and jump. The sex motive, taken by itself, is distinctly not a play motive, and when it is strongly aroused and unrestrained, it casts aside the elements of play that are associated with it in its milder manifestations. Dancing, like many other social amusements, draws the sex motive into its service to give added spice to play, but without other motives these amusements simply would not exist.

Enough has been said of sex behavior to show that the forms taken by it in human kind are the resultant of a plurality of motives, among which the sex motive is often the most serious, while the others are needed to give variety and interest. If this is true of behavior that is obviously sexual, it can scarcely be less true in behavior that seems to be fundamentally driven by quite other motives. Even though the sex motive may enter, in some obscure way, into many of these activities, it is futile to assert, as the Freudians seem to do, that the other motives are mere shams, and that sex furnishes the whole driving force wherever it is present at all. It is a mistake to overlook the importance of mixed motives in the complex forms of human activity.

Freud's conceptions of suppression and sublimation would be of capital importance in a dynamic psychology, if they could be accepted at their face value. The conception of suppression aims to show what becomes of motives that are not allowed to have their way. They become unconscious, according to Freud, but still have their force and disturb the orderly operation of other forces. Suppression somewhat of this character is undoubtedly a fact, not only in relation to sex impulses but with reference to curiosity, anger, and other motives. Suppressed anger will sometimes 'smoulder in the bosom', disturbing other activities and eventually breaking out in deeds. But this is not the only way in which rejected motives behave. In considering the 'factor of selection', we saw the great frequency with which it came into play, and the universality of inhibition of one tendency as part of the process of choosing the alternative. Selection and inhibition occur at prac-

tically every moment of the day. Of the impulses that are inhibited, most simply die a natural death, while some are depressed rather than suppressed, and remain behind, not unconscious, indeed, but also not strong, so that they have little effect on the further course of events. This is the rule, and suppression, in the Freudian sense, the exception.

Freud's 'sublimation' is an attractive concept. It is 'nice' to believe that crude motives, that cannot be allowed their natural outlet, can be drained off into other activities, so that a libidinous infatuation, sluiced out of its natural channel, can be made to drive the wheels of an artistic or humanitarian hobby. But there is no clear evidence that this can be accomplished. What does happen sometimes is that, in the effort to escape from, and distract oneself from, a strong but unwelcome impulse, one turns to some other activity capable of enlisting interest; and, since the unwelcome impulse is not easily resisted, one has to become as absorbed as possible in this other activity. Under such conditions, interest in this other activity may grow into a strong motive force and effectually supplant the unwelcome impulse. But this is distinctly not making the unwelcome impulse do work foreign to its own tendency. This impulse is not drawn into service, but is resisted. If there were no other and contrary motive force, the impulse in question would have its own way. We did see that the tendency towards a 'consummatory reaction' acted as the drive to other mechanisms, but these were mechanisms that subserved the main tendency, whereas 'sublimation' would mean that the tendency toward a certain consummation could be made to drive

mechanisms irrelevant or even contrary to itself. There seems to be really no evidence for this, and it probably is to be regarded as a distinctly wrong reading of the facts of motivation.

Though it is well for the dynamic psychologist to scrutinize closely the concepts brought forward by those who are closely in touch with the intricate and baffling phenomena of the insanities and neuroses, and though he cannot admit the claim sometimes made that only the students of these phenomena are in a position to contribute anything to the psychology of human motives, still he should have no hesitation in admitting the great interest and stimulating value of the ideas coming from this source, and he should fully recognize the necessity he is under of contributing to a psychology that shall hold good of the abnormal as well as the normal play of motive forces.

VIII

DRIVE AND MECHANISM IN SOCIAL BEHAVIOR

Looked at from a commonsense point of view, there is no part of human behavior that is more interesting and significant than the behavior of larger or smaller groups of men. From the scientific point of view, the conception of social behavior, and especially that of social consciousness, are somewhat puzzling, since the question immediately obtrudes itself, what consciousness, or what behavior, there is in a group of men that is not the consciousness or behavior of the individual members of the group. Mystical conceptions of the social mind can find no favor with the psychologists of today, who belong almost wholly to the hard-headed variety. We may as well admit, first as last, that there is no over-consciousness appertaining to the group, and that there is no activity of the group that does not resolve itself into the activities of its members. Why then, it will be asked, should we speak at all of social behavior, and set apart a section of our psychology as the chapter on social psychology?

The puzzle may be resolved by considering analogous cases in which no question of mind or consciousness is present to complicate the matter. Suppose we have three dots on the blackboard, arranged in a particular form, triangular, let us say. Then it is perfectly true to say that the dots are all there is there, except indeed the

homogeneous spatial medium. Where then is the triangular form, since it certainly does not reside in any one of the dots taken alone, nor in the three, if each is regarded as isolated from the others? The triangular form resides in the arrangement and mutual relations of the dots. These are purely static relations, but if we consider the actions of things, we find similar cases of dynamic relations and patterns. A ball thrown into the air is acted upon by the initial impulse given it, persisting as inertia of movement and tending to carry it onward ever in the same straight line, and by the constant pull of gravity downward, as well as by the resistance of the air. It moves, accordingly, in a curved path. Now the curved path does not represent the working of any force peculiar to itself; there is simply the combination of the three elementary forces mentioned; but in a real sense there is something in the total action besides the isolated action of three forces, namely, their joint action.

In the same way, when two or more human individuals are together, their mutual relationships and their arrangement into a group are facts which would not be disclosed if we confined our attention to each individual separately; and, when they act together, upon some common object—which may be one of themselves, or some other person, as well as a non-human object—the combination of their actions is a fact that could not be observed by considering the individuals one at a time.

The significance of group behavior is greatly increased in the case of human kind by the fact that some of the tendencies to action of the individual are related defi-

nitely to other persons, and could not be aroused except by other persons acting as stimuli. An individual reared in entire isolation would not reveal his competitive tendencies, his tendencies towards the opposite sex, his protective tendencies towards children. Evidently we should never get an adequate picture of woman's nature unless we observed the mother with her child. This is the most striking instance of the general law that the traits of human nature do not fully manifest themselves until the individual is brought into relationship with other individuals.

Social psychology has then to consider both the behavior of the individual as far as this is aroused and directed by the stimulus of other individuals, and the combination of the activities of individuals into group activity. In respect to the second of these general problems, the province of social psychology can only with difficulty, if at all, be kept distinct from that of sociology.

On the side of motive or drive, social behavior has long been a puzzle to the psychologist, since the motives that are most obviously present in the individual—apart from the parental instinct—are individualistic or self-seeking. In society, the individual submits to some limitation of his self-seeking tendencies, and the puzzle has been, to find the motive that led to this submissiveness.

One of the first to attempt a solution of this problem was Hobbes, the English royalist philosopher of the time of Charles I and Cromwell. He could discover nothing in man's native tendencies to limit self-seeking, and taught that the natural state of mankind would accord-

ingly be a 'bellum omnium contra omnes', a state of unlimited aggressiveness. But such a state of war would defeat its own end, since no one could rest secure even of his life, and therefore it was an elementary requirement of the nature of things that men should limit their individual self-seeking, and come to some understanding with one another by which a modicum of individual security and welfare should be reached. Stated in terms of native tendencies, this means, as Wallas has pointed out in his critique of the older social psychology,[1] that social behavior is motived by fear—fear for one's own life and well-being because of the aggression of other men seeking the same things for themselves.

It would not indeed be necessary to suppose that this fear is present as an active emotion in every dealing of man with his fellows. A limitation of self-seeking, engendered at first by calculating fear, would become habitual and automatic. The actual aggression being suppressed by the authority submitted to by a group of men because of the power of that authority to suppress aggression, there would develop a 'negative adaptation' to the presence of other men, just as a kitten becomes accustomed to the presence of a dog in the house, and ceases to fear him.

Such an interpretation of social behavior, however consistently a Hobbes may work it out, and however appropriate it may appear in certain disordered states of society, is almost instinctively rejected by any one of strong social tendencies. It leaves no room for any positive attraction towards social intercourse, but would make the fellow-man a danger or at the best a neutral-

[1] In *The Great Society.*

ized danger to be regarded with indifference; whereas the fact is, without doubt, that society affords a positive satisfaction to the majority of men. Love of company is a fact to be reckoned with in any attempt to analyze and derive the social motives.

The eighteenth century, with its greater security and prosperity, offered a milder substitute for this hard social psychology of the seventeenth. Jeremy Bentham and others taught that man, seeking his own welfare, found he could best obtain it by working for the welfare of his fellows. Instead of making what he wanted himself, he made what his neighbor required, and was then able to exchange products with his neighbor to their mutual advantage. Perception of the economic advantage of society was the basis of society. This interpretation, while recognizing no native drive towards social behavior, but only a motive acquired as the result of experience, does at least leave room for a positive attractiveness of society. My neighbor is no longer simply a potential danger more or less restrained by authority, but he is the source of benefit to me and becomes connected in my mind with that benefit, so as to arouse in me a positive reaction and not simply avoidance or indifference. Yet this economic derivation of the social motive is still unsatisfactory. It leaves the matter about as follows: I desire certain goods for my private consumption, and, having found that I can secure these from my neighbor if I will in turn provide him something he desires for his private consumption, I willingly become and remain a member of a society which makes such mutual help possible. 'You help me get what I want, and I'll help you get what you want'. But when

the question is raised, what it is we want, and an answer sought in the use made of the goods obtained by mutual exchange, we find that the consumption is not so strictly private as the 'mutual help' conception requires. Beyond the minimum required for the maintenance of life, a large share of consumption has a social character. Veblen[1] has emphasized this social character of consumption in rather cynical fashion by calling it 'conspicuous waste'; and Taussig[2] has called attention to the fact that the typical 'money-maker' does not amass goods to enjoy them in secret, but spends largely to outdo his rivals, and in other ways to win himself prestige and social recognition. His social behavior is not confined to working for others that they may work for him, and his social motive is not simply the desire for private consumption; for he shows in consumption as well as in production a social interest, not accounted for by Bentham. His satisfactions are social, as well as the means by which he reaches them. The selfish needs which he labors to gratify turn out to be needs for social intercourse and recognition. Society is not simply a means for him, but an end as well.

In the latter part of the nineteenth century another conception of the social force was put forward, first perhaps by Bagehot, most eloquently by Tarde, most psychologically, perhaps, by Baldwin. They believed they had found the socializing force in *imitation*. What characterizes a given social group in distinction from other groups is community of customs and manners,

[1] In his *Theory of the Leisure Class* and his *Imperial Germany and the Industrial Revolution*.

[2] In *Inventors and Money-makers*.

beliefs, feelings, and purposes. This agreement between individuals in a group goes far beyond the scope of instinctive behavior, and must be due to the influence of one individual upon another, of the older generation upon the younger, and of the group acting as a mass on the individuals composing it. One individual patterns his conduct, beliefs, and sentiments on those of another individual, or on those prevailing in the group. By imitation of what is current in a group, custom and tradition are maintained, imitation here acting as a conservative agency. By imitation of an individual possessing prestige by virtue of his eminence in some respect, new manners and beliefs may be spread throughout a group, or transmitted from one group to another, and thus progress also is brought about by imitation. A large body of facts of social behavior was thus subsumed under a single general law.

The mechanism of imitation was conceived after the analogy of reflex action. An individual performing a certain act in the presence of another was the stimulus evoking a like act in that other, the brain being so constituted that such a stimulus led inevitably, or at least easily, to such a response. The imitative mechanism was possessed by animals as well as men. It was at this point—in animal behavior—that the imitation psychology was first put to the test.

Do animals learn by imitation? This was the question asked. In his experiments on the learning of cats, dogs, and monkeys, Thorndike arranged to have an animal already trained in a certain trick perform it in the presence of an untrained animal. A cat that had learned to get out of a cage was placed in the cage with

an untrained cat—or the two might be placed in similar cages side by side. The trained cat promptly went through the proper motions and got out. This was repeated many times before the new cat was tried to see whether it had learned the trick, or would now learn it more quickly than a cat without this experience. The result was negative; there was no evidence of learning by imitation; and this was true even of the monkey, commonly held to be a very imitative animal—so held, perhaps, because its behavior so much resembles that of human beings. Later experiments by other investigators have failed to modify this negative conclusion in any important respect, though there is evidence that the higher or anthropoid apes occasionally derive benefit from watching their fellows perform a trick. The song of birds is in some respects an exception. In general, imitation appears not to afford a means by which animals learn.

With children, though it is clear that they pick up a great deal from older persons, it is not at all clear that they learn much by mere imitation. That is to say, it is not clear that the imitative tendency which the child certainly shows frees him at all from the necessity of learning by trial and error. Learning to talk is a case in point. The elements of vowel and consonantal production being provided, as was said before, by native equipment, the selection and combination of these instinctive movements into the words and phrases of a language being just as clearly in some sense an imitative process, it is none the less true that the child's early attempts at imitating spoken words are very imperfect, and that he has to go through a long trial and error process before he speaks as those around him speak. He imitates

models, but must *learn* to do it. He has no reflex mechanisms insuring correct imitation, but apparently a natural tendency to *try* to imitate, along with the ability to perceive the act imitated with sufficient precision to serve as a check on the correctness of his attempts at imitation.

What is meant here by 'ability to perceive' requires a little elucidation. It may be made clear by reference to two somewhat peculiar instances of imitation.

The spectators of a football game may often be observed, by any one who, with an interest in human behavior, turns his attention from the players to the audience, to execute themselves some of the movements of the players, especially at critical moments. When the full back is making a rather deliberate kick, the feet of some of the audience may be observed to make a kick-like movement. This appears like an especially good instance of purely reflex imitation, since the movement is entirely unintentional and to no purpose, and often unconscious. A little further observation, however, introduces difficulty; since it may happen, when the player's movement is delayed beyond the moment when it is expected, that the movement of the spectator's foot *precedes* that of the player. In such a case, the spectator's movement is clearly not imitative in the strict sense, since the reaction comes before the supposed stimulus. Evidently the spectator's movement depends on an understanding of the situation and a perception of the requirement for a certain movement, and equally on an interest that the movement shall be performed, since it is the kick of a player on one's chosen side that is thus, as it were, helped along by the spectator.

The other case was named by Baldwin 'delayed imitation'. The imitative reaction occurs, not directly after the movement imitated, but after an interval that may be one of hours or days. The following is an example that came under my own observation. A boy of three years, accompanying his father to a friend's house, heard his father greeted on entrance by "Hello, Dodger!"—a nickname not previously used in the child's presence. The child did not imitate this greeting at the time, but the next day, when the father entered the house, the child called out, "Hello, Dodger!" Though this is, in a broad sense, an imitative reaction, it did not conform to the reflex type. Evidently the child had observed with interest the nickname as spoken by the father's friend, and he had also perceived the social situation—the father entering a house and being greeted in a certain way; and on the recurrence of a similar social situation, the child makes the response that he had formerly noted and connected with the situation, the mere motor act being already well within the child's power. Imitation in children depends, perhaps always, on a perception of the act imitated, with some degree of understanding and with previously acquired power to execute the act. That is to say that the child's imitation, far from conforming to the simple reflex type, involves a certain intellectual activity, while also it does not free the child from the necessity of learning an act new to him by a process of trial and error. But what I wish especially to emphasize is the imitation motive. There exists in the child at a certain early age, and in some degree later as well, a tendency to imitate, a drive, easily aroused, towards performing acts like those per-

ceived in other persons, especially in persons that possess for the child a degree of prestige. The imitating child, or youth or adult, is not a purely passive mechanism, but contains a drive towards imitation that can readily be aroused to activity. The child *likes* to imitate, this liking being part of his general social orientation. The objection to the imitation psychology, as usually taught, is that it makes of imitation a ready-made reflex mechanism, while it fails to recognize the drive towards imitation, or the drive towards social perception and behavior generally.

Besides imitation of movements, the imitation psychology recognized also an imitation of beliefs, feelings, and purposes.

The imitation of beliefs went by the name of suggestion, and the main element in the conception of suggestion was the passivity of the recipient. He was supposed, in adopting the beliefs of the social medium, to be very much in the condition of the hypnotized subject, who accepts what is told him without the normal degree of resistance or criticism, and is thus liable to induced hallucinations and similar absurdities. The absence of normal resistance is, I think, the distinguishing mark of suggestion in strongly marked instances such as those occurring in hypnosis. Now it is true that beliefs are frequently adopted from other persons without much resistance or examination; but it is not true that the recipient is purely passive, for here again, I believe, we can detect the presence of a social motive. We like to agree with the views expressed by another person, and especially by a group of persons. There is a sense of comfort and satisfaction in thus agreeing,

while independence or opposition, to which also there is a natural tendency, is a more strenuous attitude. Let two persons, just made acquainted, be attracted towards each other and begin to be friends: what we find them doing is to exchange views; and if they find themselves in agreement, they experience a satisfaction that is quite exhilarating. People with the same view gravitate together, and a group of like-thinking persons is eminently satisfactory to its members until they become negatively adapted to one another. There is, then, an easily aroused drive towards accepting beliefs held by one's associates, and the process is by no means so passive as it has often been represented.

The same criticism can be passed on the current conception of sympathetic induction of the emotions, as presented especially by McDougall. The expression of emotion by one person is supposed to act as a stimulus on another person, arousing the like emotion in him; and this second person has been conceived as purely receptive or passive in the process. The examples cited are such as these: when one child cries, another, hearing the cry, begins to cry himself; when we hear or see some one laughing, we feel like laughing ourselves; and anger and fear are similarly contagious. These examples, when closely scrutinized, appear somewhat doubtful evidence, and certainly require further investigation before they can be accepted at their face value. It often happens that two children become tired or hungry at about the same time, and begin to cry together because affected alike by these stimuli to weeping rather than by induction from one to the other. Or it may happen that when one child is punished and cries, the other,

knowing from experience that his turn is coming, reacts to this anticipation. In many cases, a child is in no way moved to weeping by the presence of another child crying, but rather to interested observation or even to joy. Where there seems, at first sight, to be a sympathetic induction of woe, there is a good chance, as illustrated above, either that a common cause is acting upon the two individuals, or that the second individual to be affected is reached, not by the direct sensory stimulus of the other's expression, but by way of associations formed in previous experience. The same possibilities, or very similar ones, have to be reckoned with in the cases of induced laughter, anger, or fear.

It is, then, open to considerable doubt whether ready-made mechanisms exist in our native equipment which are directly aroused by the sight of emotion so as to produce the same emotion in the beholder. But what is certainly true, here as in the analogous cases of imitation and suggestion, is that we have a *liking* to have others feel as we do and to feel as others do. This is distinctly 'more sociable' than for one of two companions to be merry while the other is sad, or for one to be vexed at something which leaves the other unmoved. Companionship is more companionable, more successful, when emotions are 'shared'. The desire for companionship involves a desire for sympathy and a desire to be sympathetic. In other words, the individual in whom an emotion is induced is not a mere passive mechanism, but contains within himself a drive towards sympathetic emotion; and it is often by way of this drive, rather than by a direct and mechanical induction, that the emotional state comes to be shared by a group of companions.

Quite in line with induction of actions (imitation), of beliefs (suggestion), and of emotions (sympathy), is induction of purposes, often referred to under the caption of 'mob mind'. The imitation psychologists pointed out that an individual was often infected by a crowd of which he was a member with purposes repugnant to his individual habits and predilections. This, it was explained, was due to the overpowering force of a mass of men. The individual became a mere passive mechanism played upon by the crowd. Same criticism as above: the individual is not passive, for a drive within him is aroused. He *likes* to have the same purpose as his fellows in the group. Far from being bereft of purpose and converted into a passive machine, he is intensely purposeful at such times. Besides the primitive drives of fear and anger that are sometimes aroused, definite objects to be attained are often present in the 'mob mind', such as: to put out a fire, to move a heavy object, to capture a runaway cow or induce a balky horse to start, to raise an anchor, sail a schooner, or to do a thousand things where a crew or gang work together. To be sure, it is stretching the use of words to call all these aggregations of men 'mobs'; but it is still more out of place to use the mob, properly so called, as the best type of all group activity. The panic-stricken mob, in particular, is a poorly chosen case for the type, since in a panic it is 'every man for himself', and group activity is abolished. Overwhelming anger also is likely to cause group action to degenerate into a 'free for all fight', in which each individual is engaged with some individual opponent. In the same way, while sex attraction certainly furnishes part of the motive for various social

activities, intensification of the sex motive causes the group to break up into couples. Group activity, in short, is best realized when none of these elemental drives is all-dominant. But the main point is that group activity has an attraction of its own, so that it is a satisfaction to the individual to engage in it. To act with others toward a common end is not, human nature being what it is, to be a mere wheel playing a passive part in the operation, but involves the awakening of a drive towards the common goal and of an interest in joint action.

The great deficiency of the imitation school of social psychology is thus that it pictures the individual as passive over against his fellows or his group, and fails to recognize his liking for agreement with his fellows in belief, emotion, purpose, and action. It fails to observe in the individual a drive towards sociability, though this tendency is certainly evident enough when we direct our attention away from tribes and nations to companionships and small friendly groups. To this point we shall return, after first taking note of the very significant effort of McDougall to develop a social psychology on a more adequate psychological basis.

McDougall begins [1] by making an inventory, already quoted under our heading of 'native equipment', of the instinctive tendencies of man, from which are derived in the course of experience all the motives that produce human activity.

He then proceeds to trace the effect of experience in compounding these innate tendencies and attaching them to specific objects; and finally endeavors to show

[1] *Introduction to Social Psychology.*

how social behavior springs from these native tendencies and their compounds. He makes a good deal here of the parental instinct and of the instinct of pugnacity, but stresses especially the instincts of self-assertion and submission, from which, indeed, he attempts to trace almost the whole development of moral conduct. In his first and wholly untutored condition, the individual simply obeys his instincts. The first modification of this instinctive behavior arises from the pleasant or painful results of instinctive action; but behavior so modified has as yet no social character. This begins to appear from the effects of reward and punishment administered by other persons, leading the individual to modify his conduct so as to get the one and avoid the other. A higher stage of social behavior is reached when the individual is sensitive to the praise or blame of other people. To be appreciative of praise or blame implies a submissive attitude in the individual. It is the praise and blame of his superiors, or of the social group, that influences him. Meanwhile, his self-assertive tendency is by no means dormant, but, as he grows up, he shakes off the domination of those who were at first his superiors, and finds new superiors in the wider world. Nearly always, the social group retains its ascendency over him, though some individuals, of strong self-assertive (self-respecting) tendencies, after experience of the divergent codes of conduct prevalent in different groups, develop codes of their own, and act according to them even in opposition to the praise or blame of their social environment. This self-governed conduct, according to McDougall, is the highest and only true type of morality.

McDougall's work represents a very definite advance in social psychology, and the general conclusion that behavior depends on native tendencies, which, however, become combined so that mixed motives are the rule in adult action, is almost sure to stand. But McDougall has so far given us only a sketch, and it would be a serious mistake to accept it as a complete picture, or to let its omissions go unchallenged.

One thing that strikes you in reading McDougall's book is the little reference made to comradeship and other relationships between equals, as compared with his constant use of the instincts of domination and submission. He speaks, indeed, of sympathy between equals and its role in the development of friendship and mutual consideration; but he apparently sees little in the activity of a group of persons who are approximately on an equality with one another to give rise to morality, justice, and rules of conduct. The following interesting passage is quoted in order to show the author at his best, and at the same time to reveal his limitations.

'All persons fall for the child into one or other of two great classes; in the one class are those who impress him as beings of superior power, who evoke his negative self-feeling, and towards whom he is submissive and receptive; in the other class are those whose presence evokes his positive self-feeling and towards whom he is self-assertive and masterful, just because they fail to impress him as beings superior to himself. As his powers develop and his knowledge increases, persons who at first belonged to the former class are transferred to the latter; he learns, or thinks he learns, the limits of their powers; he no longer shrinks from a contest with them,

and, every time he gains the advantage in any such contest, their power of evoking his negative self-feeling diminishes, until it fails completely. When that stage is reached his attitude towards them is reversed, it becomes self-assertive; for their presence evokes his positive self-feeling. In this way a child of good capacities, in whom the instinct of self-assertion is strong, works his way up the social ladder. Each of the wider social circles that he successively enters—the circle of his playmates, of his school-fellows, of his college, of his profession—impresses him at first with a sense of a superior power, not only because each circle comprises individuals older than himself and of greater reputation, but also because each is in some degree an organized whole that disposes of a collective power whose nature and limits are at first unknown to the newly-admitted member. But within each such circle he rapidly finds his level, finds out those to whom he must submit and those towards whom he may be self-assertive. . . When he enters college, the process begins again; the fourth-year men, with their caps and their colors and academic distinctions, are now his gods, and even the dons may dominate his imagination. But at the end of his fourth year, after a successful career in the schools and the playing fields, how changed again is his attitude towards his college society! The dons he regards with kindly tolerance, the freshmen with hardly disguised disdain, and very few remain capable of evoking his negative self-feeling—perhaps a 'blue', or a 'rugger-international', or a don of world-wide reputation; for the rest—he has comprehended them, grasped their limits, labelled them,and dismissed them to the class that min-

isters to his positive self-feeling. And so he goes out into the great world to repeat the process and to carry it as far as his capacities will enable him to do.

'But if once authority, wielding punishment and reward, has awakened negative self-feeling and caused its incorporation in the self-regarding sentiment, that emotion may be readily evoked; and there is always one power that looms up vaguely and largely behind all individuals—the power of society as a whole—which, by reason of its indefinable vastness, is better suited than all others to evoke this emotion and this attitude. The child comes gradually to understand his position as a member of a society indefinitely larger and more powerful than any circle of his acquaintances, a society which with a collective voice and irresistible power distributes rewards and punishments, praise and blame, and formulates its approval and disapproval in universally accepted maxims. This collective voice appeals to the self-regarding sentiment, humbles or elates us, calls out our shame or self-satisfaction, with even greater effect than the personal authorities of early childhood, and gradually supplants them more and more.' [1]

Now while all this is true and highly pertinent, it gives a very incomplete account of the social attitude of the boy or man towards his fellows. If the instincts of self-assertion and submission were the only ones operative, we should expect to see the boy attempt to attach himself to a group of older boys, in order to gratify his submissive tendency, or to a group of younger boys in order to give free play to his self-assertion. Now we do, to some extent, observe the boy seeking the company

[1] *Social Psychology*, 8th ed., 1914, pp. 194–196.

of older boys and taking a submissive attitude towards them—a fact which is good evidence of the reality of the submissive tendency. But as a rule boys seek the company of boys of about the same age and prowess. They apparently derive most satisfaction from playing together as equals. Again, the social attitude of the college senior is far from completely expressed by saying that he has 'dismissed' most members of the college world 'to the class that ministers to his positive self-feeling'; for this leaves out of account the fellowship of the seniors among themselves. It is interesting to watch a class of alumni at a reunion at the college after five or ten years in the world; so far from seeking, each man to find his new level on the basis of accomplishment since graduation, their aim is to leave aside all such distinctions and get back to their old condition of equality. Within a profession, there is no doubt plenty of emulation, but at the same time there develops a class spirit, or sense of community of aim and outlook, that gives solidarity to the profession as against other groups.

McDougall does not entirely overlook these facts, but he apparently finds little in them to his purpose. Society appears in his pages as an authority, impressing the individual with its vastness, and awakening in him a submissive attitude. It does not appear as anything interesting and attractive to the individual, except indeed, in so far as the mere multitude attracts by virtue of the gregarious instinct. The latter is conceived simply as an impulse to herd together, and as satisfied by the mere presence of a multitude of other persons. Probably this is a proper limitation on the use of the term, 'gregarious instinct', but it is not by any means

true that the social impulse is thus limited. There is an impulse to act together, as well as to be together. Let a number of children be brought together; their demands are not fully met by simply being together, but they want to do something; nor are they satisfied by each doing something on his own account in the mere presence of other children. Their demand is to play together, to engage in some sort of group activity. The group activity in which they engage has no ulterior motive—such as the fear motive or the economic motive—but it is interesting to the participants for its own sake. This behavior of children is typical of society in general. Society, we should not forget, is essentially activity or behavior; it is an activity rather than a condition. And the social motive is the tendency to engage in group activity, which is interesting and satisfying to beings of a social nature.

As typical an instance of social behavior as can be found is that of the game, whether of children or of adults. The game needs no ulterior motive, being interesting on its own account. Though play may be carried on by a solitary individual, group play is much preferred, probably because the activities possible in group activity are more varied and complex, and so offer more of interest, while the interplay of different personalities in a group game adds an element of particular interest to the participants. Except in the simplest games, there is some 'division of labor' among the players, their actions being coordinated towards some common end. Where the game is between opposing teams, the elements of rivalry and of loyalty to one's side add interest; and in proportion as 'team work' is realized,

the interest is enhanced. Thus a card game with partners is usually preferred to one in which every player is for himself. Ceremonies are close analogies of games, and the meaning which is supposed to underlie the ceremony but adds another element of interest, without detracting from the fact that the main interest is in the ceremony itself as a group activity. Where a given ceremony is common to several tribes, it often happens that the meaning attributed to it differs from one tribe to another—the real interest lies in the ceremony itself as a social activity, the 'underlying' conceptions being of less, though undoubtedly of some value. Even of the 'practical' activities of groups of men much the same can be said, since, while an economic or other motive may be essential to get the activity started, this is lost sight of in the actual performance, and the interest that then dominates is that of group activity, much as in a game.

One characteristic of a game is that the players are in certain important respects on terms of equality. This does not mean that different abilities to play the game do not have much to do with the playing, nor that, in the division of labor among the players, some may not be captains or otherwise assigned a dominating part. But it means that inequalities extraneous to the game are not allowed to enter. The older or stronger child must not 'play out of turn', but every one must have an equal chance to do as well as he can. Not infrequently, a child will undertake to assert himself and have everything his own way; but he is resisted by the others, on the ground that such behavior spoils the game and is 'no fair'. 'Rules of the game' grow up, with the object, in part, of enforcing equality between the

players, and, more generally, with the object of insuring a good game.

These 'rules of the game' deserve attention in connection with the problem of morality. McDougall has sketched for us the development of moral conduct through the interplay of the self-assertive and submissive instincts, and makes the development culminate in the self-contained individual who is no longer submissive to the praise or blame of his social environment, because he has adopted a code for himself which he regards as superior to any that the group would enforce upon him. Such a character, though admirable in its integration, may be repellent in other respects, and the content of the code of morals needs to be examined before the individual can be allowed to stand at the pinnacle of moral excellence. McDougall says nothing of fair play or of justice, because these concepts have no place except between equals, or between those who are to be treated as equals in certain respects. It is not by domination and submission that justice is brought to light, but by *resistance* to domination and by the demand for equality. Fair play in a game is a type of just dealing in larger affairs. As children in their games resist the domineering individual and achieve fair play, so the history of larger affairs shows, I believe, that justice has been hammered out by resistance to domination, and by threatening to break up the game unless certain rules are followed. If so, it is the relationship of equals, rather than that of superior and inferior, that has given content to the social code of conduct.

The main criticism to be passed upon McDougall is that he fails to recognize a definitely *social motive*. He

recognizes several motives that contribute to social life by making one individual interested in other individuals, but he recognizes none that would make group activity interesting. Society appears in his pages as an authority controlling the individual, but not as an activity attractive to the individual. Possibly his failure to notice the rather obvious fact that group action, either in a small or in a large way, is positively interesting and attractive, results from his general conviction that all human motives grow out of the list of instincts which he has given. An instinct he defines as having a definite stimulus and a definite reaction, and also a definite emotional state; and where he cannot find these three, he is undisposed to admit the presence of a native tendency capable of furnishing the driving force to action. What he here overlooks is the fact of native capacities, or rather, the fact that each native capacity is at the same time a drive towards the sort of activity in question. The native capacity for mathematics is, at the same time, an interest in things mathematical, and in dealing with such things. This is clearly true in individuals gifted with a great capacity for mathematics. Gauss, so immersed in his original mathematical work that his attention could not be got away by hunger, or bodily fatigue, or the solicitations of his friends, was certainly not driven at such times by an economic motive, or a sex motive, or a self-regarding tendency; but by nothing else in the world than his interest in what he was doing. The musical composer, though sometimes needing the spur of economic need to get him started, is carried along, once he gets into the swing of the thing, by the musical interest, and not

by the economic; and the same is true of any creative artist. Taussig, in his valuable study of *Inventors and Money-Makers*, makes it clear that inventing is an activity often engaged in for its own sake and without regard to the possible rewards. Veblen, in his *Instinct of Workmanship*, takes the same view in regard to handiwork or, in general, to the successful adaptation of means to ends. The fundamental drive toward a certain end may be hunger, pugnacity, sex, or what not, but once the activity is started, the means to the end becomes an object of interest on its own account. Workmanship is "an object of attention and sentiment in its own right. Efficient use of the means at hand, and adequate management of the resources available for the purposes of life is itself an end of endeavor, and accomplishment of this kind is a source of gratification."[1] The fact that interest develops not only in the ulterior end, but in the means to that end, can be seen in so simple a matter as the moving of a heavy stone. There is, of course, some motive of a practical sort motiving the attempt to move the stone; but once the job has been undertaken, it becomes a sort of game or contest with the stone, and decidedly interesting to the performers, both in the process and in the successful issue—without regard to the ulterior object of the whole activity. Such activities as sailing a boat, driving a horse or automobile, chopping down a tree, are simply striking cases of what is generally true, namely, that any activity, whether 'gainful' or not, provided only it is not positively disagreeable, may be entered upon as a sport or amusement, furnishing, that is to

[1] Veblen, pp. 31–32.

say, its own drive. To sum up—almost any object, almost any act, and particularly almost any process or change in objects that can be directed by one's own activity towards some definite end, is interesting on its own account, and furnishes its own drive, once it is fairly initiated. To be interesting, the process must present some difficulty and yet some prospect of a successful issue. It would be a mistake to trace all this back to a special instinct of manipulation, though undoubtedly the manipulative tendencies of young children are the first manifestation of this general type of interest, unless, indeed, it be the attention directed by them to various objects. The truth is, that, having native capacity for performing certain acts and dealing with certain classes of material, we are interested in performing these acts and handling this material; and that, once these activities are aroused, they furnish their own drive. This applies to abilities developed through training as well as to strictly native capacities. Almost anything may be made play and furnish its own motive.

The social motive—and this is the main contention in this whole discussion—is inherent in social activity. Possessing, as he eminently does, the capacity for group activity, man is interested in such activity. He needs no ulterior motive to attract him to it. It is play for him. His interest in it comes partly from the interplay of personality (which he has a native capacity to apprehend), partly from the coordination of the acts of several performers into one harmonious and well-directed action, partly from the spirit of rivalry that may be engendered between groups, and not least from the big

enterprises that can be carried through by joint action. In short, the social interest is part and parcel of the general *objective* interest of man.

The social motive is of the same order as the musical or the mathematical motive. Just as one who has the musical gift takes to music naturally and finds it interesting for its own sake, so the socially gifted individual understands other people, sees the possibilities of collective activity, and the ways of coordinating it, and enters into such doings with gusto. It would be ill-advised to speak of a social *instinct* underlying this behavior; for the fact is not that nature provides a set of special ready-made movements to be called out by the presence of other persons. The social gift is a capacity for *learning* social behavior. Individuals differ in degree in the social gift, as in other capacities; some are capable of becoming creative artists or inventors along social lines; most men are followers here as elsewhere, yet have enough capacity to participate in group activities.

The first sign of the social motive in the infant is his attention to other persons. The six-months baby gazes at faces in preference to any other object. Very early, too, he responds by vocal and other movements to the actions of other persons. A little later he reaches the so-called imitative stage, already discussed, of which the chief features are his growing ability to perceive and appreciate the actions of other persons and the results which they accomplish, and his tendency to attempt to make the same acts and reach the same results. The child is docile; he likes to be told and to be shown; and thus his curiosity about objects is mixed up with the

social motive. He is attracted to other persons in part because they satisfy his curiosity regarding a great variety of matters. If, as he grows older, his curiosity takes a scientific turn, it still remains bound up with the social motive. A science is distinctly a cooperative enterprise, while at the same time it is one in which there is much emulation. It is much more satisfactory to the scientific worker to be in touch with his fellow-workers, to report his discoveries to them, and learn theirs in turn, than to labor in isolation. Thus, the scientific interest is reinforced by the social motive. Other interests are similarly reinforced—the esthetic interest, for example. Without doubt there is an interest in beautiful things without regard to the social factor; but it is equally true that an art, like a science, is a social enterprise, as we see from the fact that creators of art come in schools and movements rather than sporadically. The apprentice attaches himself to a school, learns its ideas and technique, which, if himself a man of originality, he may then develop, and is likely to remain through life a devoted adherent, and keenly interested in the accomplishment and advance of the school.

Many drives combine to produce social activity. The fear motive drives men together in times of insecurity; the pugnacity motive bands them together for group combat; the economic motive brings industrial cooperation and organization; the self-assertive and submissive tendencies bring emulation as well as obedience; the expansion of the self to cover one's family, one's clique, one's class, one's country contributes to loyalty; while the parental instinct, expanding its scope to cover others besides children who are helpless,

leads to self-sacrifice and altruism. But besides all these there is the social motive proper, the tendency toward group activity, which is not only found by experience to be beneficial, but, what is more important psychologically, is interesting in itself to creatures that have a native capacity for that sort of action.

Recognition of the social motive affords a more adequate basis for social ethics than can be found in a psychology that attempts to derive group behavior from the self-seeking tendencies or even from the altruistic parental tendency. An ethics based on the self-seeking tendencies finds no better ideal than the superman, superior and unsubmissive to society. McDougall's ideal man is of this type—a self-contained individual with a self-selected moral code, regarding the content of which nothing definite is said or can be said. The altruistic tendency, though yielding conduct of admirable quality, is inadequate because, at its furthest reach, it would simply make other individuals as perfectly self-contained as the self-seeking tendencies would make oneself. Altruism is only incidentally social; it is concerned with 'my neighbor' as an individual, but not with group behavior. The socially estimable individual is rather one of social disposition and of public spirit than one notable for his altruistic and charitable impulses. Sociability has probably not received enough recognition as a virtue at the hands of ethics; and this from failure to observe a psychological basis for it. But once grant that group activity is interesting for its own sake, and we find a genuine social basis for ethics—the same basis, in fact, that we find for the rules of a game. Interest in the game im-

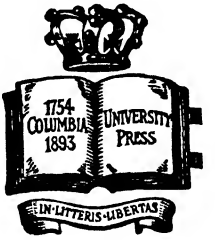
plies interest in well-coordinated and successful group action, and the rules of the game aim at that result. The rules of the game are not for the benefit of individuals, but for the success of the game as a group activity. Fair play and justice have the same basis; they are not primarily for the advantage of individuals, but for the purpose of insuring harmonious group activity.

Thus the old puzzle whether society exists for the good of the individual, or the individual for the good of society, is seen not to be a fair dilemma. If society is essentially group activity, the organization of society has as its object the furtherance of group activity. The value of society to the individual is not a derivative from other values, but arises directly from his capacity for social behavior and his strong drive towards social behavior. The best formula for social betterment, while it should not omit such contributions to purely individual values as organization can compass, and while it should certainly not set up the fiction of society as an entity superior to the individuals composing it, would emphasize especially the improvement of the conditions of group activity, with a view to making it more worthy of the efforts of the individual, and more interesting and satisfying to him.

INDEX

COLUMBIA UNIVERSITY PRESS

COLUMBIA UNIVERSITY IN THE CITY OF NEW YORK



The Press was incorporated June 8, 1893, to promote the publication of the results of original research. It is a private corporation, related directly to Columbia University by the provisions that its Trustees shall be officers of the University and that the President of Columbia University shall be President of the Press.

The publications of the Columbia University Press include works on Biography, History, Economics, Education, Philosophy, Linguistics, and Literature, and the following series:

Columbia University Contributions to Anthropology.
Columbia University Biological Series.
Columbia University Studies in Cancer and Allied Subjects.
Columbia University Studies in Classical Philology.
Columbia University Studies in Comparative Literature.
Columbia University Studies in English.
Columbia University Geological Series.
Columbia University Germanic Studies.
Columbia University Indo-Iranian Series.
Columbia University Contributions to Oriental History and Philology.
Columbia University Oriental Studies.
Columbia University Studies in Romance Philology and Literature.
Records of Civilization: Sources and Studies.
Adams Lectures Carpentier Lectures Julius Beer Lectures Hewitt Lectures Blumenthal Lectures Jesup Lectures

Catalogues will be sent free on application

COLUMBIA UNIVERSITY LECTURES

ADAMS LECTURES

Graphical Methods. By CARL RUNGE, Ph.D., Professor of Applied Mathematics in the University of Göttingen. 8vo, cloth, pp. ix+148. Price, $1.75 *net.*

JULIUS BEER LECTURES

Social Evolution and Political Theory. By LEONARD T. HOBHOUSE, Professor of Sociology in the University of London. 12mo, cloth, pp. ix+218, $2.00 *net.*

BLUMENTHAL LECTURES

Political Problems of American Development. By ALBERT SHAW, LL.D., Editor of the "Review of Reviews." 12mo, cloth, pp. vii+268. Price, $2.00 *net.*

Constitutional Government in the United States. By WOODROW WILSON, LL.D., Twenty-eighth President of the United States. 12mo, cloth, pp. vii+236. Price, $2.00 *net.*

The Principles of Politics from the Viewpoint of the American Citizen. By JEREMIAH W. JENKS, LL.D., Professor of Government and Public Administration in New York University. 12mo, cloth, pp. xviii+187. Price, $2.00 *net.*

The Cost of Our National Government. By HENRY JONES FORD, Professor of Politics in Princeton University. 12mo, cloth, pp. xv+147. Price, $2.00 *net.*

The Business of Congress. By HON. SAMUEL W. MCCALL, Member of Congress for Massachusetts. 12mo, cloth, pp. vii +215. Price, $2.00 *net.*

Thomas Jefferson: His Permanent Influence on American Institutions. By HON. JOHN SHARP WILLIAMS, United States Senator from Mississippi. 12mo, cloth, pp. ix+330. Price, $2.00 *net.*

Our Chief Magistrate and His Powers. By WILLIAM HOWARD TAFT, Twenty-seventh President of the United States. 12mo, cloth, pp. vii+165. Price, $2.00 *net.*

Constitutional Power and World Affairs. By GEORGE SUTHERLAND, former United States Senator from Utah. 12mo, cloth, pp. vii+202. $2.00 *net.*

COLUMBIA UNIVERSITY PRESS
New York City

COLUMBIA UNIVERSITY LECTURES

CARPENTIER LECTURES

World Organization as Affected by the Nature of the Modern State. By HON. DAVID JAYNE HILL, sometime American Ambassador to Germany. 12mo, cloth, pp. ix+214. Price, $2.00 *net.*

The Genius of the Common Law. By the RT. HON. SIR FREDERICK POLLOCK, Bart., D.C.L., LL.D., Bencher of Lincoln's Inn, Barrister-at-Law. 12mo, cloth, pp. vii+141. Price, $2.00 *net.*

The Mechanics of Law Making. By COURTENAY ILBERT, G.C.B., Clerk of the House of Commons. 12mo, cloth, pp. viii+209. Price, $2.00 *net.*

HEWITT LECTURES

The Problem of Monopoly. By JOHN BATES CLARK, LL.D. Professor of Political Economy, Columbia University. 12mo, cloth, pp. vi+128. Price, $1.60 *net.*

Power. By CHARLES EDWARD LUCKE, Ph.D., Professor of Mechanical Engineering, Columbia University. 12mo, cloth, pp. vii+316. Illustrated. Price, $2.50 *net.*

The Doctrine of Evolution. Its Basis and its Scope. By HENRY EDWARD CRAMPTON, Ph.D., Professor of Zoology, Columbia University. 12mo, cloth, pp. ix+311. Price, $2.00 *net.*

Medieval Story and the Beginnings of the Social Ideals of English-Speaking People. By WILLIAM WITHERLE LAWRENCE, Ph.D., Associate Professor of English, Columbia University. 12mo, cloth, pp. xiv+236. Price, $2.00 *net.*

Law and its Administration. By HARLAN F. STONE, LL.D., Dean of the School of Law, Columbia University. 12mo, cloth, pp. vii+232. Price, $2.00 *net.*

American City Progress and the Law. By HOWARD LEE MCBAIN, Ph.D., Professor of Municipal Science and Administration, Columbia University. 12mo, cloth, pp. viii+269. Price, $2.00 *net.*

JESUP LECTURES

Light. By RICHARD C. MACLAURIN, LL.D., Sc.D., President of the Massachusetts Institute of Technology. 12mo, cloth, pp. ix+251. Portrait and figures. Price, $2.00 *net.*

Scientific Features of Modern Medicine. By FREDERIC S. LEE, PH.D., Dalton Professor of Physiology, Columbia University. 12mo, cloth, pp. vii+183. Price, $2.00 *net.*

COLUMBIA UNIVERSITY PRESS
New York City